

# California Fish and Game Commission Meeting Binder



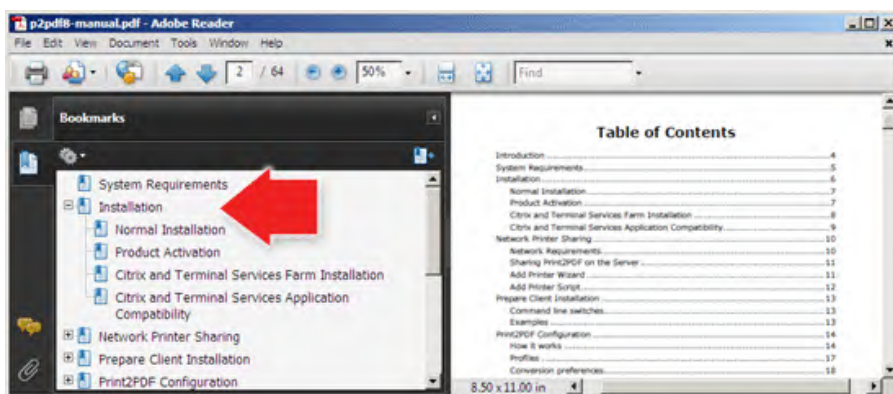
**June 11-12, 2025**  
**Sacramento**  
**(Day Two)**


## **EASY GUIDE TO USING THE BINDER**

1. Download and open the binder document using portable document reader (pdf) software like Adobe Acrobat/Reader.
2. If a bookmark panel does not automatically appear on either the top or left side of the screen, click/tap on the “bookmark symbol” located near the top left-hand corner.



3. To make adjustments to the view, use the Page Display option in the View tab. You should see something like:



4. We suggest leaving open the bookmark panel to help you move efficiently among the staff summaries and numerous supporting documents in the binder. It's helpful to think of these bookmarks as a table of contents that allows you to go to specific points in the binder without having to scroll through hundreds of pages.
5. You can resize the two panels by placing your cursor in the dark, vertical line  located between the panels and using a long click /tap to move in either direction.
6. You may also adjust the sizing of the documents by adjusting the sizing preferences located on the Page Display icons found in the top toolbar or in the View tab.
7. Upon locating a staff summary for an agenda item, notice that you can obtain more information by clicking/tapping on any item underlined in blue.
8. Return to the staff summary by simply clicking/tapping on the item in the bookmark panel.
9. Do not hesitate to contact staff if you have any questions or would like assistance.



# Overview of California Fish and Game Commission Meeting

- Welcome to a meeting of the California Fish and Game Commission. This is the 156th year of operation for the Commission, in partnership with the California Department of Fish and Wildlife. Both organizations originated from the Board of Fish Commissioners in 1870.
- The Commission's goals include preserving our wildlife heritage and conserving our natural resources through informed decision making. These meetings are vital in achieving those goals and, in that spirit, we provide the following information to be as effective and efficient toward that end.
- We are operating under the Bagley-Keene Open Meeting Act and these proceedings are being recorded and broadcast.
- In the unlikely event of an emergency, please note the location of the nearest emergency exits at your location.
- Items may be heard in any order pursuant to the determination of the presiding commissioner, which is President Zavaleta today.
- The amount of time for each agenda item may be adjusted based on time available and the number of speakers.
- If you are here at the in-person location, speaker cards need to be filled out **legibly** and turned in to staff **before** we start the agenda item.
- If you are online or on the phone, you will receive additional instructions in a few minutes.
- We will ask how many speakers we have before taking public comment; please be prepared and listen closely for your name or phone number to be called.
- When you speak, please state your name and any affiliation. Please be respectful and note that disruptions will not be tolerated. Time is precious so please be concise.
- To receive meeting agendas and regulatory notices about those subjects of interest to you, please visit the Commission's website, [www.fgc.ca.gov](http://www.fgc.ca.gov), and sign up for our electronic mailing lists.
- If you want the Commission to consider a regulation change, all petitions for regulation change must be submitted in writing on the authorized form, FGC 1, which is available on the Commission's website or directly from staff.
- For members of the public, if you have access to the Internet and are not planning to make public comment, you may listen to the meeting via our regular webcast by visiting the commission website at [www.fgc.ca.gov](http://www.fgc.ca.gov) (link is on right side).
- **Reminder!** Please silence your mobile devices and computers to avoid interruptions.

# Introductions for California Fish and Game Commission Meeting

## Commission Members

Erika Zavaleta	President (Santa Cruz)
Samantha Murray	Vice President (La Jolla)
Jacque Hostler-Carmesin	Member (McKinleyville)
Eric Sklar	Member (Saint Helena)
Darius W. Anderson	Member (Kenwood)

## Commission Staff

Melissa Miller-Henson	Executive Director
David Thesell	Deputy Executive Director
Mike Yaun	Legal Counsel
Susan Ashcraft	Marine Advisor
Ari Cornman	Wildlife Advisor
Dixie Van Allen	Program Manager
Kimi Rogers	Environmental Scientist
Sherrie Fonbuena	Associate Governmental Program Analyst
Jenn Bacon	Associate Governmental Program Analyst
David Haug	Associate Governmental Program Analyst
Kelsey Leaird	Executive Analyst
Jessica Shaw	Seasonal Clerk
Caroline Newell	California Sea Grant State Fellow
Cynthia McKeith	Staff Services Analyst

## California Department of Fish and Wildlife Staff

Chuck Bonham	Director
Chad Dibble	Deputy Director, Wildlife and Fisheries Division
Nathaniel Arnold	Deputy Director and Chief, Law Enforcement Division
Josh Grover	Deputy Director, Ecosystem Conservation Division
Sarah Fonseca	Department Tribal Advisor
Scott Gardner	Branch Chief, Wildlife Branch
Jay Rowan	Branch Chief, Fisheries Branch
Craig Shuman	Regional Manager, Marine Region

I would also like to acknowledge special guests who are present:  
(i.e., elected officials, including tribal chairpersons, and other special guests)

**Commissioners**

**Erika Zavaleta**, President  
Santa Cruz

**Samantha Murray**, Vice President  
La Jolla

**Jacque Hostler-Carmesin**, Member  
McKinleyville

**Eric Sklar**, Member  
Saint Helena

**Darius W. Anderson**, Member  
Kenwood

STATE OF CALIFORNIA  
Gavin Newsom, Governor

**Fish and Game Commission**



*Wildlife Heritage and Conservation  
Since 1870*

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**Executive Director**  
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[fgc@fgc.ca.gov](mailto:fgc@fgc.ca.gov)  
[www.fgc.ca.gov](http://www.fgc.ca.gov)

**Meeting Agenda  
June 11-12, 2025**

**East End Complex Auditorium  
1500 Capitol Avenue  
Sacramento, CA 95814**

To provide public comment or observe the meeting, attend in person at the Sacramento location. The Commission will make a reasonable effort to provide the public additional opportunities to provide public comment and observe the meeting remotely; in the event technical issues arise that impact the experience of remote attendees, we will attempt to resolve them, but the meeting will continue with those joining in person.

**Option for Remote Public Comment via Zoom or Phone**

The Commission will make a reasonable effort to allow for remote public participation through the Zoom videoconference platform. Zoom allows for computer, mobile device, or telephone connections. The Commission cannot guarantee the accessibility of the videoconference, including the quality or functionality of Zoom or the phone line. Join via Zoom directly at <https://us02web.zoom.us/j/87110613277>. For complete instructions on how to join via Zoom or phone, [click here](#) or visit the Commission meetings page at [fgc.ca.gov/meetings/2025](http://fgc.ca.gov/meetings/2025).

**Option for Remote Observation Without Public Comment**

The Commission will make a reasonable effort to live-stream the meeting to allow the public to observe the meeting without providing public comment. The Commission cannot guarantee the accessibility of the webcast including the quality of the audio or video webcast. To watch or listen on the day of the meeting, visit <http://www.fgc.ca.gov> (link is on the right side of the page near the top).

- Notes:**
- (1) See important meeting deadlines and procedures, including written public comment deadlines, starting on page 14.**
  - (2) A list of reports or other significant documents received by the commission since its April 2025 meeting is on page 9.**
  - (3) Unless otherwise indicated, the California Department of Fish and Wildlife is identified as Department.**
  - (4) All section and subsection references are to Title 14 of the California Code of Regulations (CCR), unless otherwise noted.**

June 11, 2025; 9:00 AM

Call to order and roll call to establish a quorum

1. Consider approving agenda and order of items

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**General Public Comment**

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2. **General public comment for items not on the agenda**

Receive public comment regarding topics within the Commission's authority that are not included on either day of the June 11-12, 2025 agenda.

Note: The Commission may not discuss or take action on any matter raised during this item, except to decide whether to place the matter on the agenda of a future meeting (sections 11125 and 11125.7(a), Government Code).

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**Discussion and Action Items**

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3. **Commission executive director and Department reports**

(A) ***Commission executive director***

(B) ***Department director and Law Enforcement Division***

4. **Market Squid**

(A) ***Market Squid Fishery Management Plan***

Conduct a public hearing on the draft amended *Market Squid Fishery Management Plan*.

(Pursuant to sections 7075, 7077 and 7078, California Fish and Game Code)

(B) ***Commercial take of market squid***

Discuss proposed amendments to regulations for commercial take of market squid. (Amend sections 53.01, 149 and 149.1; repeal sections 53.02 and 53.03).

5. **Recreational crab fishing gear and commercial passenger fishing vessel trap validation**

Discuss proposed amendments to regulations for recreational crab fishing gear and commercial passenger fishing vessel trap validation.

(Amend sections 29.80, 29.85, 190, 195 and 701)

6. **Application for a restricted species permit amendment**

Review an application for a restricted species permit amendment from the University of California San Diego to import, possess, transport or rear, or conduct research on transgenic painted urchins and transgenic sea squirts, and take action consistent with the Commission regulation, if warranted.

(Pursuant to subdivision 15007(e), California Fish and Game Code, and subsection 671.1(a)(8)(H), Title 14, CCR)

7. **Commission Policy on Naming Installations**

Discuss and potentially approve amendments to the Commission's Policy on *Naming Installations*, including changing the policy's title to *Naming Protected Areas*.

(Pursuant to Section 703, California Fish and Game Code)

**8. Regulation change petitions (marine)**

(Pursuant to Section 662)

(A) ***Petitions for action today***

Consider whether to grant, deny, or refer for additional review, petitions for regulation change received at previous meetings. Petitions granted today will be added to the Commission's rulemaking calendar for development and future consideration.

*No petitions are scheduled for action at this meeting.*

(B) ***New petitions***

Receive new petitions for regulation change.

*Consideration of whether to grant, deny, or refer petitions for additional review is expected to be scheduled for the August 13-14, 2025 Commission meeting.*

(C) ***Referred petitions***

Receive public comments on petitions previously referred by the Commission to staff, legal counsel, a Commission committee, and/or the Department for review and recommendation.

*Commission action on any referred petition will be scheduled under part (A) of this agenda item for discussion and consideration once a recommendation is received.*

*The Commission is not expected to discuss referred MPA (marine protected area) petitions at this meeting. General MPA comments not specific to petitions, will be received under Agenda Item 2 (General public comment for items not on the agenda).*

**9. Non-regulatory requests from previous meetings (marine)**

Consider and potentially act on non-regulatory requests submitted by members of the public at previous meetings.

**10. Committee and Department reports**

(A) ***Tribal Committee***

Receive summary and consider approving recommendations from the May 7, 2025 Committee meeting. Discuss referred topics and consider revisions to topics and timing.

(B) ***Marine Resources Committee***

Discuss referred topics and consider revisions to topics and timing. Consider approving draft agenda topics for the next committee meeting to be held July 16-17, 2025.

(C) ***Department Marine Region***

Receive updates on items of note since the previous Commission meeting.

I. ***Pacific sardine***

Public discussion of action taken by the Department director to close recreational and commercial Pacific sardine fisheries south of Point Conception to the U.S./Mexico border due to elevated levels of domoic acid. (Pursuant to subdivision 5523(a)(2), California Fish and Game Code)

II. *Commercial rock crab*

Update on the reopening of the commercial rock crab fishery in northern California from the California/Oregon border to the Humboldt Bay entrance at the north jetty.

(Pursuant to subdivision 5523(b)(2), California Fish and Game Code)

III. *Recreational Dungeness crab*

Public discussion of action taken by the Department director in the recreational Dungeness crab fishery to prohibit the use of crab traps in Fishing Zone 3 (Sonoma/Mendocino county line to Pigeon Point) effective at 6:00 p.m. on May 1, 2025.

(Pursuant to Section 29.80)

**June 12, 2025; 8:30 AM**

**Call to order and roll call to establish a quorum**

**11. Consider approving agenda and order of items**

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**Consent Items**

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Note: Items on the consent calendar are expected to be routine and non-controversial. After public comment, the Commission will consider approving items on the consent calendar in a single vote without discussion. The presiding commissioner may choose to remove any item from the consent calendar and allow a separate discussion and potential action on that item in response to a request by a Commission member, staff, or an interested person.

**12. Initial private lands wildlife habitat enhancement and management area (PLM) plans and licenses (consent)**

Consider approving initial PLM plans and 2025-2029 licenses for:

(Pursuant to Section 601)

- |   |                              |
|---|------------------------------|
| (A) Butte County                        | (E) Shasta County            |
| I. Honcut Hills Ranch                   | I. Blodgett Ranch            |
| II. Table Mountain Ranch                | II. Clover Creek Ranch       |
| (B) Colusa County                       | (F) Tehama County            |
| I. Turkey Track Ranch                   | I. Baccala Ranch             |
| (C) Kings, Fresno and Monterey counties | (G) Yuba and Butte counties  |
| I. Van Boxtel Ranch                     | I. O'Brien and Prairie Creek |
| (D) San Luis Obispo County              |                              |
| I. Elk Run Ranch                        |                              |
| II. Parrish Pozo Ranch                  |                              |

**13. Five-year PLMs (consent)**

Consider approving five-year PLM plans and 2025-2029 licenses for:  
(Pursuant to Section 601)

- |                                      |                                   |
|--------------------------------------|-----------------------------------|
| (A) Butte County                     | IV. Five Dot Ranch – Willow Creek |
| I. Llano Seco Ranch                  | V. Mendiboure Ranch               |
| (B) Butte and Tehama counties        | (E) Monterey County               |
| I. Rock Creek                        | I. San Bartolome Ranch            |
| (C) Del Norte County                 | (F) Shasta County                 |
| I. Alexandre Dairy PLM               | I. JS Ranch                       |
| (D) Lassen County                    | (G) Stanislaus County             |
| I. Five Dot Ranch – Horse Lake       | I. Rooster Comb Ranch             |
| II. Five Dot Ranch – School Section  | (H) Tehama County                 |
| III. Five Dot Ranch – Tunnel Springs | I. Big Bluff Ranch                |

**14. Annual PLMs (consent)**

Consider approving annual PLM plans for:  
(Pursuant to Section 601)

- |                                    |                              |
|------------------------------------|------------------------------|
| (A) Butte County                   | (E) Los Angeles County       |
| I. Angel Slough                    | I. Santa Catalina Island     |
| II. Deseret Farms                  | (F) Mendocino County         |
| III. Magers Ranch                  | I. Schneider Ranch           |
| IV. M&T Chico Ranch                | (G) Modoc County             |
| (B) Calaveras County               | I. Basin View Ranch          |
| I. Ordway Ranch                    | II. Fort Bidwell Ranch       |
| (C) Glenn County                   | III. Lookout Ranch           |
| I. Anderson Ranch                  | IV. Roberts Ranch            |
| II. Bird Haven Ranch               | V. SL Ranch                  |
| (D) Lassen County                  | (H) San Bernardino County    |
| I. Ash Valley Ranch                | I. Big Morongo Springs Ranch |
| II. Clarks Valley Ranch            | (I) Shasta County            |
| III. Dixie Valley Ranch            | I. Black Ranch               |
| IV. Five Dot Ranch – Avila         | II. Cow Creek Ranch          |
| V. Grasshopper Valley Ranch        | III. Duncan Creek Ranch      |
| VI. Kramer Ranch PLM               | IV. Hathaway Oak Run Ranch   |
| VII. Mendiboure Cold Springs Ranch | V. Jerusalem Creek Ranch     |
| VIII. Observation Peak Ranch       | VI. Kampmann Ranch           |
| IX. Red Rock Ranch                 | VII. Rickert Ranch           |
| X. Walton Homestead Family, LLC    |                              |



- (J) Shasta and Siskiyou counties
  - I. Willow Creek Ranch
- (K) Siskiyou County
  - I. Long Prairie Farms
  - II. Pondosa
  - III. Red Rock Valley Farms

- (L) Tehama County
  - I. El Rancho Rio Frio
  - II. Little Dry Creek Ranch
  - III. Mill Creek Ranch
  - IV. Salt Creek Ranch
- (M) Yolo County
  - I. 360 Ranch
  - II. Smith Flat Ranch
- (N) Yuba County
  - I. Sugarloaf-Bangor Ranch

**15. Gerry's curly-leaved monardella (consent)**

Consider approving the Department's request for a 30-day extension to review the petition to list Gerry's curly-leaved monardella (*Monardella sinuata* subsp. *gerryi*) as a threatened or endangered species under the California Endangered Species Act. (Pursuant to subdivision 2073.5(b), California Fish and Game Code)

**16. Mojave desert tortoise (consent)**

Consider ratifying findings on the decision to list Mojave desert tortoise (*Gopherus agassizii*) as endangered under the California Endangered Species Act (Pursuant to subdivision 2075.5(e)(2), California Fish and Game Code)

**17. Duck stamp expenditure proposals for fiscal year 2025-26 (consent)**

Consider approving proposed duck stamp project expenditures from the Duck Stamp Dedicated Account Fund for Fiscal Year 2025-26. (Pursuant to sections 3702 and 3704, California Fish and Game Code)

**18. Wildlife rehabilitation (consent)**

Consider approving additional sufficiently related changes to regulations; the changes are to regulations approved by the Commission on December 12, 2024 for the proposed amendments regarding wildlife rehabilitation. (Repeal Section 679; add sections 679.1, 679.2, 679.3, 679.4, 679.5, 679.6, 679.7, 679.8 and 679.9; add Chapter 2 and Chapter 3 of the Native Wildlife Rehabilitation 679 Regulations Manual; and amend Section 703)

**19. Golden mussel emergency regulation (consent)**

Consider a second 90-day extension of the emergency regulation adding golden mussel (*Limnoperna fortunei*) to the list of animals restricted from live importation, transportation and possession. (Amend Section 671)

**20. White sturgeon sport fishing 2084 regular rulemaking (consent)**

Consider adopting proposed amendments to regulations for the recreational take of, tagging of, and reporting requirements for, white sturgeon (*Acipenser transmontanus*) in inland and ocean waters, pursuant to California Fish and Game Code Section 2084 and consider taking final action under the California Environmental Quality Act. (Repeal sections 5.78, 5.79, 27.92, 27.93 and 27.95; and amend sections 1.74, 5.80, 5.81, 27.60, 27.90, 27.91 and 701)

**21. Falconry (consent)**

Consider adopting proposed amendments to falconry regulations.  
(Amend sections 670 and 703)

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**Discussion and Action Items**

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**22. Western Joshua Tree Conservation Plan**

Discuss and consider approving the revised draft *Western Joshua Tree Conservation Plan*.

(Pursuant to subdivision 1927.6(a), California Fish and Game Code)

**23. Quino checkerspot butterfly**

Consider and potentially act on the petition, the Department's evaluation report, and comments received to determine whether listing Quino checkerspot butterfly (*Euphydryas editha quino*) as a threatened or endangered species under the California Endangered Species Act may be warranted.

(Pursuant to sections 2074 and 2074.2, Fish and Game Code)

**24. Morro manzanita take provision**

Receive a recommendation from the Department and consider authorizing publication of notice of intent to authorize take of Morro manzanita while a candidate species under the California Endangered Species Act, pursuant to Section 2084 of the California Fish and Game Code.

(Add Section 749.14)

**25. Striped bass**

Consider authorizing publication of notice of intent to amend regulations regarding recreational striped bass harvest size limits.

(Amend sections 5.75 and 27.85)

**26. Wildlife Prosecutor of the Year**

Announce and recognize the recipient of the annual Wildlife Prosecutor of the Year award.

(Pursuant to the Commission *Wildlife Prosecutor of the Year Policy*)

**27. Regulation change petitions (wildlife and inland fisheries)**

(Pursuant to Section 662)

**(A) Petitions for action today**

Consider whether to grant, deny, or refer for additional review, petitions for regulation change received at previous meetings. Petitions granted today will be added to the rulemaking calendar for development and future consideration.

I. *Petition 2025-03: Remove ferrets from the restricted species list.*

**(B) New petitions**

Receive new petitions for regulation change.

*Consideration of whether to grant, deny, or refer for additional review is expected to be scheduled for the August 13-14, 2025 Commission meeting.*

(C) ***Referred petitions***

Receive comments on petitions previously referred by the Commission to staff, legal counsel, a Commission committee, or the Department for review and recommendation.

*Commission action on any referred petition will be scheduled for consideration once a recommendation is received.*

**28. Non-regulatory requests from previous meetings (wildlife and inland fisheries)**

Consider and potentially act on non-regulatory requests submitted by members of the public at previous meetings.

**29. Committee and Department reports**

(A) ***Wildlife Resources Committee***

Receive summary and consider approving any recommendations from the May 15, 2025 Committee meeting. Discuss referred topics and consider revisions to topics and timing.

(B) ***Department Wildlife and Fisheries Division, and Department Ecosystem Conservation Division***

Receive updates from Department divisions on items of note since the previous Commission meeting.

**30. Commission administrative items**

(A) ***Legislative report***

Receive updates on state and federal legislation and regulatory activity, and consider providing direction to staff on potential actions.

(B) ***Rulemaking timetable updates***

Review and consider approving changes to the perpetual timetable for anticipated regulatory actions.

(C) ***Potential meeting dates for 2027***

Review and provide feedback on draft meeting dates for 2027 as proposed by staff.

(D) ***Future meetings and new business***

Review logistics and approve draft agenda items for the next Commission meeting (August 13-14, 2025), approve location changes for January through June of 2026, consider any changes to approved meeting dates, or introduce new business for a future meeting agenda.

**31. General public comment for items not on the agenda**

Receive public comment regarding topics within the Commission's authority that are not included on either day of the June 11-12, 2025 agenda.

Note: The Commission may not discuss or take action on any matter raised during this item, except to decide whether to place the matter on the agenda of a future meeting (Section 11125 and subdivision 11125.7(a), California Government Code).

**Adjourn**

## Public Receipt of Documents

This section of the agenda highlights reports or other significant documents received by the Commission since the previous meeting. Any Commission discussion or action on these documents will be noticed and placed on the agenda of a future meeting. Since May 14, 2025, the Commission has received two documents:

1. Department's five-year status review report for Bogg's Lake hedge-hyssop (*Gratiola heterosepala*), which is listed as endangered under the California Endangered Species Act. Received May 6, 2025. The status review can viewed at <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=232412&inline>.
2. Revised draft *Western Joshua Tree Conservation Plan* and appendices will be available soon at two links:
  - a. Volume I. Revised draft plan, dated June 2025  
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=232533&inline>
  - b. Volume II. Appendices, dated June 2025  
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=232534&inline>

## **Executive Session**

(Not open to the public)

At a convenient time during the regular agenda of its June 11-12, 2025 meeting, the Commission will recess from the public portion of the agenda and conduct a closed session on the agenda items below. The Commission is authorized to discuss these matters in a closed session pursuant to Government Code Section 11126, subdivisions (a)(1), (c)(3), and (e)(1), and Fish and Game Code Section 309. After closed session, the Commission will reconvene in public session, which may include announcements about actions taken during closed session.

- (A) Pending litigation to which the Commission is a party
  - I. United Water Conservation District v. California Fish and Game Commission (challenge to final Southern California steelhead CESA listing decision).
  - II. The People of the State of California v. Hannam Chain U.S.A., Inc., et al. (restricted species) and Hannam Chain U.S.A., Inc., et al. v. California Fish and Game Commission (challenge to restricted species regulation)
  - III. The Ballona Wetlands Land Trust v. California Fish and Game Commission and California Dept. of Fish and Wildlife (challenge to decisions related to public uses on an ecological reserve)
  - IV. The Ballona Wetlands Land Trust v. California Fish and Game Commission (Ballona Wetlands Ecological Reserve petition for regulation change)
  - V. Borba et al. v. Merced Co, Merced Irrigation Dist., California Dept. of Fish and Wildlife, and California Fish and Game Commission (complaint for damages related to flooding)
  - VI. Perez-Ramirez et al. v. County of Merced, City of Merced, Merced Irrigation Dist., California Dept. of Fish and Wildlife, and California Fish and Game Commission (complaint for damages related to flooding)
  - VII. Glenn et al. v. County of Merced, City of Merced, Merced Irrigation Dist., California Dept. of Fish and Wildlife, and California Fish and Game Commission (complaint for damages related to flooding)
- (B) Possible litigation involving the Commission
- (C) Staffing
- (D) Deliberation and action on license and permit items
  - I. Consider the accusation in FGC Case No. 25ALJ03-FGC, regarding revocation of Ronald Ghera's commercial fishing license and Dungeness crab vessel permit.
  - II. Consider the proposed decision in FGC Case No. 24ALJ16-FGC, regarding suspension of Odysseus Richcreek's commercial fishing license.
  - III. Consider the proposed decision in FGC Case No. 24ALJ35-FGC, regarding suspension of Jerry Lynn Willett's commercial fishing license.
  - IV. Consider the proposed decision in FGC Case No. 24ALJ36-FGC, regarding suspension of David James Bitts's Dungeness crab vessel permit.
  - V. Consider the proposed decision in FGC Case No. 24ALJ08-FGC, regarding revocation of Christopher Miller's commercial fishing license and lobster operator permit.

## California Fish and Game Commission Meeting Schedule

**Note:** As meeting dates and locations can change, please visit [www.fgc.ca.gov](http://www.fgc.ca.gov) for the most current list of meeting dates and locations. All Commission meetings will include a webinar/teleconference option for attendance and every effort will be made to ensure that committee meetings include the same.

Meeting Date	Commission Meeting	Committee Meeting
July 16-17, 2025		<b>Marine Resources</b> California Natural Resources Headquarters Building 715 P Street, 2nd Floor Sacramento, CA 95814
August 12, 2025		<b>Tribal</b> California Natural Resources Headquarters Building 715 P Street, 2nd Floor Sacramento, CA 95814
August 13-14, 2025	California Natural Resources Headquarters Building 715 P Street, 2nd Floor Sacramento, CA 95814	
September 11, 2025		<b>Wildlife Resources</b> California Natural Resources Headquarters Building 715 P Street, 2nd Floor Sacramento, CA 95814
October 8-9, 2025	Sacramento area	
November 5-6, 2025		<b>Marine Resources</b> Sacramento area
December 9, 2025		<b>Tribal</b> California Natural Resources Headquarters Building 715 P Street, 2nd Floor Sacramento, CA 95814
December 10-11, 2025	Sacramento area	

## **Other Meetings of Interest**

Meetings listed here are organizations for which the Commission: (1) is a member, or (2) takes action based upon regulations developed by that organization.

### **Association of Fish and Wildlife Agencies**

- September 21-24, 2025 – Tucson, AZ
- September 13-16, 2026 – Lancaster, PA

### **Pacific Fishery Management Council**

- June 12-18, 2025 – Rohnert Park, CA
- September 18-24, 2025 – Spokane, WA
- November 13-19, 2025 – Costa Mesa, CA
- March 4-10, 2026 – San Francisco, CA
- April 7-13, 2026 – Portland, OR
- June 11-17, 2026 – Spokane, WA
- September 17-23, 2026 – Vancouver, WA
- November 13-19, 2026 – Orange County, CA

### **Pacific Flyway Council**

- September 12, 2025 – Provo, UT
- March 2026 – Date and location TBD
- August or September 2026 – Date and location TBD

### **Western Association of Fish and Wildlife Agencies**

- June 1-5, 2026 – Boise, ID

### **Wildlife Conservation Board**

- August 28, 2025 – Sacramento, CA
- November 20, 2025 – Sacramento, CA
- February 2026 – Sacramento, CA
- May 2026 – Sacramento, CA
- August 2026 – Sacramento, CA
- November 2026 – Sacramento, CA



# Important Commission Meeting Procedures Information

## Welcome to a Meeting of the California Fish and Game Commission

This year marks the 156th year of operation of the Commission in partnership with the California Department of Fish and Wildlife. Our goal is the preservation of our heritage and conservation of our natural resources through informed decision making; Commission meetings are vital in achieving that goal and we provide this information to be as effective and efficient toward that end. Welcome, and please let us know if you have any questions.

## Persons with Disabilities

Persons with disabilities needing reasonable accommodation to participate in public meetings or other Commission activities are invited to contact the Department's Civil Rights Office (CRO) at [civilrights@wildlife.ca.gov](mailto:civilrights@wildlife.ca.gov). Accommodation requests for facility and/or meeting accessibility and requests for American Sign Language interpreters should be submitted at least two weeks prior to the event. Requests for real-time captioners should be submitted at least four weeks prior to the event. These timeframes are to help ensure that the requested accommodation is met. If a request for an accommodation has been submitted but is no longer needed, please contact the CRO immediately.

## Stay Informed

To receive meeting agendas and regulatory notices about those subjects of interest to you, visit the Commission's website, [www.fgc.ca.gov](http://www.fgc.ca.gov), to sign up on our electronic mailing lists.

## Submitting Written Comments

The public is encouraged to comment on any agenda item. Submit written comments by one of the following methods: E-mail to [fgc@fgc.ca.gov](mailto:fgc@fgc.ca.gov); mail to California Fish and Game Commission, P.O. Box 944209, Sacramento, CA 94244-2090; deliver to California Fish and Game Commission, 715 P Street, 16<sup>th</sup> Floor, Sacramento, CA 95814 (you must call at least one business day in advance to arrange delivery). Materials provided to the Commission may be made available to the general public.

## Comment Deadlines

The **Comment Deadline** for this meeting is **5:00 p.m. on May 29, 2025**. Written comments received at the Commission office by this deadline will be made available to Commissioners prior to the meeting.

The **Supplemental Comment Deadline** for this meeting is **noon on June 6, 2025**. Comments received by this deadline will be made available to Commissioners at the meeting.

After these deadlines, written comments may be delivered in person to the meeting. Please bring 12 copies of written comments to the meeting and give them to the designated staff member just prior to speaking.

## Petitions for Regulation Change

Any person requesting that the Commission adopt, amend, or repeal a regulation must complete and submit form FGC 1, *Petition to the California Fish and Game Commission for Regulation Change* (as required by Section 662, Title 14, CCR), available at <https://fgc.ca.gov/Regulations/Petition-for-Regulation-Change>. To be received by the

Commission at this meeting, petition forms must be received by the **Supplemental Comment Deadline** or delivered in person at the meeting during the regulation change petitions agenda item. Petitions received at this meeting will be scheduled for consideration at the next regularly scheduled business meeting, unless the petition is rejected under staff review pursuant to subsection 662(b), Title 14, CCR.

### Non-Regulatory Requests

All non-regulatory requests follow a two-meeting cycle to ensure proper review and thorough consideration of each item. All requests submitted by the **Supplemental Comment Deadline** (or heard during general public comment at the meeting) will be scheduled for receipt at this meeting and scheduled for consideration at the next regularly scheduled business meeting.

### Speaking at the Meeting

**To speak on an agenda item in-person**, please complete a “speaker card” and provide it to the designated staff member before the agenda item is announced. Please complete one speaker card per item. Cards will be available near the entrance of the meeting room.

**To speak on an agenda item via Zoom or phone**, please “raise” your hand either through the Zoom function or by pressing \*9 once on your phone when prompted at the beginning of the agenda item.

1. In-person speakers will be identified in groups; please line up when your name is called. Speakers on Zoom or phone will be identified by your Zoom display name or the last three digits of your phone number; listen closely for when your name or number is called.
2. When addressing the Commission, please give your name and the name of any organization you represent, and provide your comments on the item under consideration.
3. If there are several speakers with the same concerns, you are encouraged to appoint a spokesperson and avoid repetitive testimony.
4. The presiding commissioner will allot between one and three minutes per speaker per agenda item, subject to several exceptions:
  - a. The presiding commissioner may allow up to five minutes for an individual speaker if a minimum of three individuals who are present when the agenda item is called have ceded their time to the designated spokesperson, and the individuals ceding time forfeit their right to speak to the agenda item.
  - b. In-person participants ceding their time shall complete a speaker card and approach the staff table with the spokesperson so that staff may confirm the presence of those ceding their time. Persons participating via Zoom or phone and ceding their time to another speaker must notify the Commission at [fgc@fgc.ca.gov](mailto:fgc@fgc.ca.gov) prior to the start of the agenda item, including to whom they are ceding their time, and must be present during the agenda item.
  - c. Individuals may receive advance approval for additional time to speak if such requests are received by email or delivery to the Commission office by the **Supplemental Comment Deadline**. The president or designee will approve or deny the request no later than 5:00 p.m. two days prior to the meeting.
  - d. An individual requiring an interpreter is entitled to at least twice the allotted speaking time pursuant to Government Code Section 11125.7(c).

- e. An individual may receive additional time to speak to an agenda item at the request of any commissioner.

***Agenda items may be heard in any order and on either day pursuant to the discretion of the presiding commissioner.***

### **Visual Presentations/Materials**

All electronic presentations must be submitted by the ***Supplemental Comment Deadline*** and approved by the Commission executive director before the meeting.

1. Electronic presentations must be provided by email to [fgc@fgc.ca.gov](mailto:fgc@fgc.ca.gov). If the presentation file is too large to send via email, contact staff to identify an alternative method for submitting the file.
2. All electronic formats must be Windows PC compatible.
3. If presenting at the in-person meeting location, it is recommended that you bring a print copy of your presentation in case of technical difficulties.

## Staff Summary for June 11-12, 2025

**12. Initial Private Lands Wildlife Habitat Enhancement and Management Area (PLM) Plans and Licenses (Consent)****Today's Item****Information** ☐**Action** ☒

Consider approving initial PLM plans and 2025-2029 licenses.

**Summary of Previous/Future Actions (N/A)****Background**

California Fish and Game Code sections 3400-3408 and Title 14 Section 601 prescribe conditions for a PLM program that provides incentives for landholders to manage their property for the benefit of fish and wildlife in exchange for access to increased recreational opportunities, such as hunting tags or extended seasons ("harvest program"). In return for a harvest program, the landholder must prepare a biologically-sound wildlife management plan and complete specific wildlife habitat improvements on the PLM property.

The Department has reviewed the initial management plans for 10 new properties in nine counties, consisting of approximately 26,725 acres.

The Department recommends that the Commission approve the wildlife management plans, applications, and 2025-26 harvest programs under specified conditions (Exhibit 2). Habitat improvements accomplished under these plans will enhance and maintain wildlife resources on and around the PLM areas. The goals and objectives stated in the management plans are compatible with Department management plans for appropriate species in these areas and the Department finds they comply with Commission regulations and policies for PLM licenses and plans.

**Significant Public Comments (N/A)****Recommendation**

**Commission staff:** Approve the initial PLM plans, 2025-29 licenses, applications, and 2025-26 harvest programs under a motion to adopt the consent calendar.

**Department:** Approve the initial PLM licenses, management plans, applications and proposed 2025-26 harvest programs under the conditions specified in Exhibit 2.

**Exhibits**

1. [Department memo, received May 16, 2025](#)
2. ["PLM Area License Initial Management Plans, 2025-2029, Proposed Seasons, Harvests, and Habitat Improvements," received May 16, 2025](#)

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the staff recommendations for items 12 through 21 on the consent calendar.

## Staff Summary for June 11-12, 2025

**13. Five-Year Private Land Management (PLM)****Today's Item**Information ☐Action ☒

Consider approving five-year PLM plans and 2025-2029 licenses.

**Summary of Previous/Future Actions (N/A)****Background**

California Fish and Game Code sections 3400-3408 and Title 14 Section 601 prescribe conditions for a PLM program that provides incentives for landholders to manage their property for the benefit of fish and wildlife in exchange for access to increased recreational opportunities, such as hunting tags or extended seasons ("harvest program"). In return for a harvest program, the landholder must prepare a biologically-sound wildlife management plan and complete specific wildlife habitat improvements on the PLM property.

The Department has reviewed the five-year licenses (2025-29) for 12 properties in seven counties consisting of approximately 72,255 acres.

The Department recommends that the Commission approve the wildlife management plans, applications, and 2025-26 harvest programs under conditions specified in Exhibit 2. Habitat improvements accomplished under these plans will enhance and maintain wildlife resources on and around the PLM areas. The goals and objectives stated in the management plans are compatible with Department management plans for appropriate species in these areas and the Department finds they comply with Commission regulations and policies for PLM licenses and plans.

**Significant Public Comments**

A hunter shares their family's experience in a seven-person hunt party during a November 2024 SHARE elk hunt in the Ft. Dick area, a place where they have hunted previously, in 2020 and 2021. The hunter expresses concerns with various actions the group encountered from what appeared to be employees of Alexandre Dairy herding elk with multiple vehicles and gunshots to keep the herd on a PLM property. They state that, after attempting to reach local wildlife officers, the group felt unsafe and decided to return home without a successful hunt. They identify a potential conflict of interest for one of the Alexandre Dairy managers, and ask that the PLM not be renewed. (Exhibit 3)

The recent comments are similar to comments the Commission has received in the past; Exhibit 4 provides an example.

**Recommendation**

**Commission staff:** Under a motion to adopt the consent calendar, approve five-year PLM licenses for 2025-29, and proposed harvest programs and habitat improvements as recommended by the Department for the identified properties, with the exception of Alexandre Dairy PLM; instead, approve for Alexandre a one-year license, harvest program and habitat improvements, specifying conditions for the one-year license, and directing staff to work with the Department to learn more about the allegations made in Exhibit 3.

## Staff Summary for June 11-12, 2025

**Department:** Approve five-year PLM license renewals for 12 properties, under the conditions specified in Exhibit 2.

### Exhibits

1. [Department memo, received May 16, 2025](#)
2. [“PLM Area License 5-Year Renewals, 2025-2029 Proposed Seasons, Harvests, and Habitat Improvements,” received May 16, 2025](#)
3. [Email from the J.M. family, received March 13, 2025](#)
4. [Sample message from Michael Stapleton, received November 3, 2020](#)

### Motion

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the staff recommendations for items 12 through 21 on the consent calendar.

## Staff Summary for June 11-12, 2025

**14. Annual PLMs (Consent)****Today's Item**Information ☐Action ☒

Consider approving annual PLM plans.

**Summary of Previous/Future Actions (N/A)****Background**

California Fish and Game Code sections 3400-3408 and Title 14 Section 601 prescribe conditions for a PLM program that provides incentives for landholders to manage their property for the benefit of fish and wildlife in exchange for access to increased recreational opportunities, such as hunting tags or extended seasons ("harvest program"). In return for a harvest program, the landholder must prepare a biologically-sound wildlife management plan and complete specific wildlife habitat improvements on the PLM property.

The Department has reviewed the annual reports for 43 properties in thirteen counties, consisting of approximately 285,736 acres.

The Department recommends that the Commission approve the wildlife management plans, license applications, and 2025-26 harvest programs under conditions specified in Exhibit 2. Habitat improvements accomplished under these plans will enhance and maintain wildlife resources on and around the PLM areas. The goals and objectives stated in the management plans are compatible with Department management plans for appropriate species in these areas and the Department finds they comply with Commission regulations and policies for PLM licenses and plans.

**Significant Public Comments (N/A)****Recommendation**

**Commission staff:** Approve the PLM license applications, habitat improvements, and 2025-26 harvest programs as recommended by the Department for 43 properties, under a motion to adopt the consent calendar.

**Department:** Approve continuing the PLM licenses and approve the annual seasons, harvests and habitat improvements for 43 properties, under the conditions specified in Exhibit 2.

**Exhibits**

1. [Department memo, received May 16, 2025](#)
2. ["PLM Area License Annual Renewals, 2025-2026 Proposed Seasons, Harvests, and Habitat Improvements," received May 16, 2025](#)

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the staff recommendations for items 12 through 21 on the consent calendar.



## Staff Summary for June 11-12, 2025

**15. Gerry's Curly-Leaved Monardella (Consent)****Today's Item**Information ☐Action ☒

Consider approving the Department's request for a 30-day extension to review the petition to list Gerry's curly-leaved monardella (*Monardella sinuata* subsp. *gerryi*) as a threatened or endangered species under the California Endangered Species Act.

**Summary of Previous/Future Actions**

- Received petition February 19, 2025
- Transmitted petition to Department February 28, 2025
- Public receipt of petition April 16, 2025
- **Today consider/approve Department's request for 30-day extension June 11-12, 2025**

**Background**

On February 19, 2025, the Commission received a petition from California Native Plant Society to list Gerry's curly-leaved monardella as endangered under CESA. On February 28, 2025, Commission staff transmitted the petition to the Department for review.

California Fish and Game Code Section 2073.5 requires that the Department evaluate the petition and submit a written evaluation with a recommendation to the Commission within 90 days of receiving the petition. Under this section, the Department may request an extension of up to 30 days to complete the evaluation.

The Department has requested a 30-day extension (Exhibit 1). If approved, the due date for the Department's evaluation would change to June 19, 2025.

**Significant Public Comments (N/A)****Recommendation**

**Commission staff:** Approve the Department's request for a 30-day extension.

**Exhibits**

1. [Department memo requesting 30-day extension, received June 3, 2025](#)

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the staff recommendations for items 12 through 21 on the consent calendar.

## Staff Summary for June 11-12, 2025

**16. Mojave Desert Tortoise (Consent)****Today's Item****Information** ☐**Action** ☒

Consider ratifying findings on the decision to list Mojave desert tortoise (*Gopherus agassizii*) as endangered under the California Endangered Species Act (CESA).

**Summary of Previous/Future Actions**

- |   |                         |
|---|-------------------------|
| • Received CESA petition  | March 20, 2020          |
| • Received Department's 90-day evaluation report  | June 24-25, 2020        |
| • Determined petitioned action may be warranted; initiating Department's one-year status review | October 14, 2020        |
| • Public notice of having received the Department's one-year status review                      | February 14-15, 2024    |
| • Determined listing is warranted   | April 17-18, 2024       |
| • <b>Today consider adopting findings</b>   | <b>June 11-12, 2025</b> |

**Background**

On March 20, 2020, the Commission received a petition to change the status of Mojave desert tortoise (*Gopherus agassizii*, currently listed in Section 670.5 under its former common name, desert tortoise) from threatened to endangered under CESA. At its October 2020 meeting, the Commission determined that listing may be warranted, and subsequently provided notice regarding Mojave desert tortoise's protected, candidate species status. The notice prompted the Department's status review of the species, as required by California Fish and Game Code Section 2074.6.

The Commission received the Department's status review report on January 9, 2024. In April 2024, pursuant to Fish and Game Code Section 2075.5, the Commission determined that listing Mojave desert tortoise as endangered is warranted, as recommended by the Department.

Section 2075.5 requires the Commission to adopt written findings to support its listing decision. Accordingly, Commission staff developed a draft notice of findings for Commission consideration and action today, provided as Exhibit 1.

**Significant Public Comments (N/A)****Recommendation**

**Commission staff:** Under a motion to adopt the consent calendar, adopt the proposed findings for the decision to list Mojave desert tortoise (*Gopherus agassizii*) as endangered.

**Exhibits**

1. [Draft notice of findings, dated May 27, 2025](#)

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the staff recommendations for items 12 through 21 on the consent calendar.

## Staff Summary for June 11-12, 2025

**17. Duck Stamp Expenditure Proposals for Fiscal Year 2025-26 (Consent)Today****'s Item****Information ☐****Action ☒**

Consider approving proposed duck stamp project expenditures from the Duck Stamp Dedicated Account Fund for Fiscal Year 2025-26.

**Summary of Previous/Future Actions (N/A)****Background**

Pursuant to California Fish and Game Code sections 3702-3705, the Commission must approve any projects funded by the State Duck Stamp Account in the Fish and Game Preservation Fund; the funds shall be used for projects or endowments to protect, preserve, restore, enhance, and develop migratory waterfowl breeding and wintering habitat, evaluate habitat projects, and conduct waterfowl resource assessments and other waterfowl-related research.

The Department annually requests and reviews proposals for projects that meet the statutory goals of this dedicated account, which are reviewed by the Department's Duck Stamp Advisory Committee and then submitted by the Department to the Commission as a list of recommended projects. Exhibits 1 and 2 contain an overview and summary of the proposed projects for consideration and approved for funding in FY 2025-26.

For FY 2025-26, authorized expenditures from this fund are \$1,939,000. After deducting the required administrative overhead costs (limited to 6%, per Fish and Game Code Section 3701, or \$116,340), and the mandated amount portioned to Canada (\$2.25 per stamp/validation per Section 3704 or \$145,878 calculated based on the 2025 license year duck stamp validations), a total of \$1,677,783 is available for new and ongoing projects.

The Department proposes funding seven new projects totaling \$1,283,440. A total of 14 projects are recommended, including continued authorization for ongoing projects. Combined, the new and ongoing projects in California total \$1,677,783 (Exhibit 2).

**Significant Public Comments (N/A)****Recommendation**

**Commission staff:** Approve this proposed FY 2025-26 funding from the Duck Stamp Account as recommended by the Department.

**Department:** Approve the projects identified in Exhibit 2 for funding from the Duck Stamp Account in FY 2025-26.

**Exhibits**

1. [Department memo, received June 6, 2025](#)
2. [Department summary of recommendations for FY 2025-26 California Duck Stamp Account expenditures.](#)

Staff Summary for June 11-12, 2025

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the staff recommendations for items 12 through 21 on the consent calendar.

## Staff Summary for June 11-12, 2025

**19. Golden Mussel Emergency Regulation (Consent)****Today's Item**Information ☐Action ☒

Consider a second 90-day extension of the emergency regulation adding golden mussel (*Limnoperna fortunei*) to the list of animals restricted from live importation, transportation and possession.

**Summary of Previous/Future Actions**

- Adoption hearing for emergency regulation to add golden mussel to the list of restricted animals December 11-12, 2024
- Adoption hearing for 90-day extension of emergency regulation to retain golden mussel on the list of restricted animals April 16-17, 2025
- **Today consider adopting a second 90-day extension of emergency regulation to retain golden mussel on the list of restricted animals June 11-12, 2025**

**Background**

The Department requests the Commission readopt for a second 90-day extension an emergency regulation to retain golden mussel on the list of restricted animals; readopting the regulation will reduce the potential for people to introduce and move golden mussels to other waters of the state, prevent damage to native wildlife and their habitats, protect agricultural interests of the state, and protect public health and safety. For additional background on the initial adoption and the first readoption of the emergency action, see exhibits 1 and 2.

***Updates Since the Last Meeting***

There are no changes to the proposed regulatory language since the original emergency action adopted during the December 2024 Commission meeting. Further details of the proposed extension are available in the emergency statement and proposed regulatory language (exhibits 4 and 5).

As of May 23, 2025, golden mussels have been detected 51 times (see exhibits 7 and 8). Several of the detections occurred after the draft finding of emergency and statement of proposed emergency regulatory action (emergency statement, exhibit 3) was prepared. If the Commission takes action today to extend the emergency regulation, staff will provide an updated list of detections in the emergency statement before filing the rulemaking with the Office of Administrative Law.

In August, staff will present to the Commission a regular rulemaking to add golden mussel and other detrimental species to the list of restricted animals.

**Significant Public Comments**

An individual requests that the Commission close the Sacramento-San Joaquin Delta to all recreational boating until mandatory inspections and boat cleaning can be done immediately after leaving the Delta, thus eliminating the need for boat inspections prior to entering lakes.

## Staff Summary for June 11-12, 2025

**Recommendation**

**Commission staff:** Find, pursuant to Section 399 of the Fish and Game Code, that adopting the proposed emergency regulation is necessary for the immediate conservation, preservation, and protection of birds, mammals, fish, amphibians, or reptiles, including, but not limited to, their nests or eggs, and for the immediate preservation of the public peace, health and safety, or general welfare. Further determine, pursuant to Section 11346.1 of the Government Code, that an emergency situation exists and find the proposed regulation is necessary to address the emergency. Readopt the emergency regulation to amend Section 671 for a second 90-day extension, as recommended by the Department, and authorize staff to update the emergency statement with the most current list of detections prior to filing the rulemaking with the Office of Administrative Law.

**Department:** Readopt the emergency regulation to amend Section 671 for a second 90-day period as recommended in Exhibit 5.

**Exhibits**

1. [Staff summary for Agenda Item 16, December 11-12, 2024 Commission meeting \(for background purposes only\)](#)
2. [Staff summary for Agenda Item 6, April 16-17, 2025 Commission meeting \(for background purposes only\)](#)
3. [Department memo, received May 16, 2025](#)
4. [Draft emergency statement, dated April 28, 2025](#)
5. [Draft proposed regulatory language for readoption](#)
6. [Draft economic and fiscal impact statement \(STD 399\) and addendum](#)
7. [Timeline of detections of golden mussel through May 23, 2025](#)
8. [Map of detections of golden mussel through May 23, 2025](#)
9. [Email from Chris Fenton, dated May 10, 2025](#)

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the staff recommendations for items 12 through 21 on the consent calendar.

## Staff Summary for June 11-12, 2025

**20. White Sturgeon Sport Fishing 2084 Regular Rulemaking (Consent)****Today's Item****Information** ☒**Action** ☐

Consider adopting proposed amendments to regulations for the recreational take of, tagging of, and reporting requirements for white sturgeon (*Acipenser transmontanus*) in inland and ocean waters, pursuant to California Fish and Game Code Section 2084 and consider taking final action under the California Environmental Quality Act.

***Staff recommends continuing the adoption decision to the August 13-14, 2025 Commission meeting.***

**Summary of Previous/Future Actions**

- |  |                                      |
|--|--------------------------------------|
| • Wildlife Resources Committee (WRC) vetting   | September 2023 and January 2024; WRC |
| • Adoption hearing for white sturgeon catch and release fishing during candidacy <i>emergency regulations</i>            | August 14-15, 2024                   |
| • Adoption hearing for first 90-day extension of catch and release fishing during candidacy <i>emergency regulations</i> | December 11-12, 2024                 |
| • Notice hearing for white sturgeon sport fishing 2084 regular rulemaking  | February 12-13, 2025                 |
| • Discussion hearing   | April 16-17, 2025                    |
| • Adoption hearing for the second 90-day extension of fishing during candidacy <i>emergency regulations</i>              | May 14, 2025                         |
| • <b>Today: Continue adoption decision</b>   | <b>June 11-12, 2025</b>              |
| • Adoption hearing   | August 13-14, 2025                   |

**Background**

At its June 2024 meeting, the Commission declared white sturgeon a candidate under the California Endangered Species Act (CESA). At its August 2024 meeting, to alleviate substantial economic harm to fishing guides and businesses that rely on this fishery, the Commission adopted catch-and-release fishing regulations under an emergency rulemaking, pursuant to California Fish and Game Code Section 2084 (Exhibit 1).

At its February 12-13, 2025 meeting, the Commission authorized notice of its intent for a standard rulemaking to ensure the catch-and-release provisions endured once the emergency regulations expired. In addition to catch-and-release only provisions, minor modifications to the regulations were authorized as outlined in the meeting materials. (Exhibit 2)

There have been no updates to the rulemaking or associated regulatory language since the notice hearing.

***California Environmental Quality Act***

The Department prepared and transmitted to the Commission a draft initial study and negative declaration; Staff evaluated that draft and determined that the document reflects the



## Staff Summary for June 11-12, 2025

independent judgment of the Commission. Staff submitted the environmental document for public comment. To comply with the California Environmental Quality Act (CEQA), prior to taking final action on a proposed project, the Commission must publish the initial study and negative declaration with the California State Clearinghouse a minimum of 30 days in advance. The thirty-day period is not yet complete as of this meeting. At the conclusion of the 30 days, Commission staff will create a draft final negative declaration, updated to reflect public comment and any changes necessary to address public comment, for the Commission's consideration.

**Significant Public Comments (N/A)****Recommendation**

**Commission staff:** Continue the decision to the August 13-14, 2025 meeting.

**Department:** Adopt the proposed amendments to the regulations as described in the initial statement of reasons and identified in the proposed regulatory language.

**Exhibits**

1. [Staff summary for Agenda Item 14, August 14-15, 2024 Commission meeting \(for background purposes only\)](#)
2. [Staff summary for Agenda Item 9, February 12-13, 2025 Commission meeting \(for background purposes only\)](#)

**Motion (N/A)**

## Staff Summary for June 11-12, 2025

**21. Falconry (Consent)****Today's Item**Information ☐Action ☒

Consider adopting proposed amendments to falconry regulations.

**Summary of Previous/Future Actions**

- |  |                         |
|--|-------------------------|
| • Wildlife Resources Committee vetting | January 15, 2025; WRC   |
| • Notice hearing                       | April 16-17, 2025       |
| • Discussion hearing                   | May 14, 2025            |
| • <b>Today's adoption hearing</b>      | <b>June 11-12, 2025</b> |

**Background**

The Department oversees the practice of falconry via issuance of licenses. Only licensed falconers are permitted to possess, house, trap, transport, and use raptors for the purpose of hunting or training. The Department requested the proposed amendments for the purpose of conforming certain provisions of the falconry regulations with recent court orders and to comply with federal falconry regulations. Additional background information can be found in Exhibit 1.

**Updates Since Previous Meeting**

There have been no changes proposed to the regulatory language since the notice was published. On June 3, 2025, the Department transmitted a memo in lieu of a pre-adoption statement of reasons (PSOR) summarizing responses to comments received (Exhibit 6 and 7).

Today the Commission will consider adopting proposed amendments to falconry regulations.

**Significant Public Comments (N/A)****Recommendation**

**Commission staff:** Under a motion to adopt the consent calendar, adopt the proposed amendments to regulations for falconry as recommended by the Department.

**Department:** Adopt amendments to regulations for falconry as presented in the initial statement of reasons.

**Exhibits**

1. [Staff summary for Agenda Item 8, April 16-17, 2025 Commission meeting \(for background purposes only\)](#)
2. [Initial statement of reasons](#)
3. [Proposed regulatory language](#)
4. [Proposed Department forms](#)
5. [Economic and fiscal impact statement \(STD 399\)](#)
6. [Memo in lieu of PSOR, received June 3, 2025](#)
7. [Responses to public comments](#)

Staff Summary for June 11-12, 2025

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the staff recommendation for items 12 through 21 on the consent calendar.

## Staff Summary for June 11-12, 2025

**22. Western Joshua Conservation Plan****Today's Item****Information** ☐**Action** ☒

Discuss and consider approving the revised draft Western Joshua Tree Conservation Plan.

**Summary of Previous/Future Actions**

- |   |                         |
|---|-------------------------|
| • Determined that listing western Joshua tree under the California Endangered Species Act may be warranted                      | September 2020          |
| • Public notice that western Joshua tree is protected as a candidate species under the California Endangered Species Act (CESA) | October 2020            |
| • Received from Department the draft <i>Western Joshua Tree Conservation Plan</i> , dated December 2024                         | December 11-12, 2024    |
| • Discussed draft plan  | February 12-13, 2025    |
| • Received update from the Department and discussed draft plan  | April 16-17, 2025       |
| • <b>Today potentially take action on revised draft plan</b>  | <b>June 11-12, 2025</b> |

**Background**

For background information on development of a western Joshua tree conservation plan and related Commission actions, see Exhibit 1.

***Updates Since Last Meeting***

The Department has reviewed comments made during the last two Commission meetings, and from California tribes, the public, and stakeholders, incorporating a number of changes to the draft plan based on that input. See Exhibit 4 for a summary of the changes and Exhibit 2 for the revised draft plan. Today, the Department will present a summary of the changes made to the plan (Exhibit 3).

The Department undertook extraordinary effort to deliver the revised draft plan for this meeting. Commission staff recognizes that commissioners and the public have had a short time to digest the revised draft plan before today's scheduled potential approval. The plan is substantive with approximately 300 pages in the body of the document and about 100 pages of appendices. Many of the public comments highlighted in this staff summary provide detailed recommendations for the plan, reflecting on the prior draft and the Department's April presentation about modifications to the previous draft. The Western Joshua Tree Conservation Act, which is state legislation that dictates the scope of the plan, precludes some changes to the plan that have been requested by the public.

***California Environmental Quality Act***

Section 21080.56 of the California Public Resources Code provides that restoration projects meeting certain requirements are eligible for a statutory exemption from the California Environmental Quality Act (CEQA) via a process coordinated by the Department; the

## Staff Summary for June 11-12, 2025

Department refers to this exemption as the Statutory Exemption for Restoration Projects (SERP). Lead agencies wishing to rely on this exemption must determine the project meets the SERP eligibility criteria and submit a request to the Department documenting the determination and asking for the Department director's concurrence. Commission staff determined that approval of the conservation plan is a CEQA project that meets the SERP eligibility criteria; based on that determination and working with Department staff, staff submitted a concurrence request to the Department for the conservation plan (Exhibit 5). In response, the Department transmitted a cover letter and Department director concurrence (exhibits 6 and 7).

### Significant Public Comments

1. The Town of Yucca Valley requests that the Commission and Department propose changes to the legislature and administration regarding exemptions for: Existing development, maintenance of existing public works improvements, state-mandated wastewater collection programs, accessory dwelling units, infill residential development, and fire safety projects near existing structures. The town also recommend that buffer distances be determined by desert native plant specialists on a case-by-case basis (Exhibit 8).
2. Compass Consulting states that the mitigation buffer should be reduced further, actions that do not kill the tree are not "take," relocated trees should not be charged under the mitigation schedule, and the Commission should adjust its CEQA approach, including CEQA exemptions (Exhibit 9).
3. Reed Family Companies requests that the plan include: Mining reclamation operations as avoidance and minimization measures, alternative mitigation measures, and permit streamlining for relocations within avoidance buffers. They also oppose the listing of western Joshua tree under CESA. (Exhibit 10)
4. The California Construction and Industrial Materials Association (CalCIMA) requests the plan be amended to: Clarify the distinction between the plan and the permitting process, address avoidance and minimization for previously entitled homes and infrastructure, introduce an avoidance and minimization framework for mineral development, and introduce an avoidance and minimization safe harbor for relocated and preserved trees. CalCIMA suggests that the plan: Define clear, measurable conservation targets aligned with the legislature's directive to maintain the species' status without requiring endangered listing; ground land conservation goals in sound ecological and economic data, ensuring realistic, achievable outcomes; leverage existing public lands and conservation frameworks to focus efforts efficiently; and provide transparent, detailed information on funding, staffing, and permitting processes necessary to support plan implementation (Exhibit 11).
5. CalPortland provides some suggested changes to the plan, focused on large projects and the potential for revegetation and other minimization efforts in mine reclamation areas (Exhibit 12).
6. The Large-Scale Solar Association, Solar Energy Industries Association, and American Clean Power Association posit that the plan imposes measures for buffer zones, seed collection, and relocation that are technically infeasible and misaligned with the underlying abundance of western Joshua trees. The associations urge

## Staff Summary for June 11-12, 2025

clarification and refinement of relocation guidelines, acknowledgement of evidence regarding species abundance, and a delay of the Commission's final action to approve the plan. (Exhibit 13)

7. The San Bernardino County Board of Supervisors supports: Reducing buffer zones to 20 feet regardless of tree size, development of a programmatic framework to allow defensible space within 5 feet of structures, and an exemption for imminent and emergency infrastructure repairs (Exhibit 14).

### Recommendation

**Commission staff:** Hear public comment today and place approval of the Western Joshua Tree Conservation Plan on the agenda for the August 2025 meeting to provide time for public and stakeholder review of the June version of the revised draft plan.

**Department:** Approve the Western Joshua Tree Conservation Plan.

### Exhibits

1. [Staff summary for Agenda Item 14, April 16-17, 2025 Commission meeting \(for background purposes only\)](#)
2. [Department transmittal memo and revised draft Western Joshua Tree Conservation Plan, received June 3, 2025](#)
3. [Department presentation](#)
4. [Summary of Changes to Western Joshua Tree Conservation Plan – June 2025, received from the Department on May 28, 2025](#)
5. [CEQA Statutory Exemption for Restoration Projects Concurrence Request, dated June 4, 2025](#)
6. [Department cover letter, received June 6, 2025](#)
7. [Department Director Statutory Exemption for Restoration Projects Concurrence, received June 6, 2025](#)
8. [Letter from Shane Stueckle, Deputy Town Manager, Town of Yucca Valley, received April 15, 2025](#)
9. [Letter from Julie Gilbert, President, Compass Consulting, received April 24, 2025](#)
10. [Letter from Ian Davies, Environmental Manager, Reed Family Companies, received May 7, 2025](#)
11. [Letter from Adam Harper, Senior Director of Policy, CalCIMA, received May 29, 2025](#)
12. [Email from Matthew Hinck, Vice President of State Government Affairs, CalPortland, received May 9, 2025](#)
13. [Letter from Shannon Eddy, Executive Director, Large-scale Solar Association; Stephanie Doyle, Director of State Affairs for California, Solar Energy Industries Association; and Quintana Hayden, Senior Director for Wildlife & Federal Lands, American Clean Power Association, received May 29, 2025](#)
14. [Letter from Dawn Rowe, Chair, San Bernardino County Board of Supervisors, received May 29, 2025](#)

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**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission continues the Western Joshua Tree Conservation Plan item to the August meeting.

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**23. Quino Checkerspot Butterfly****Today's Item**Information ☐Action ☒

Consider and potentially act on the petition, the Department's evaluation report, and comments received to determine whether listing Quino checkerspot butterfly (*Euphydryas editha quino*) as a threatened or endangered species under the California Endangered Species Act (CESA) may be warranted.

***This item is not ready for Commission consideration. Staff recommends continuing this item to the August 13-14, 2025 meeting.***

**Summary of Previous/Future Actions (N/A)****Background**

California Fish and Game Code Section 2074 requires that consideration of a petition be scheduled no sooner than 30 days after public release of the Department's evaluation report. Due to unforeseen circumstances, the petition evaluation was not posted to the Commission's website 30 days prior to the June 11-12 Commission meeting.

The Department's petition evaluation report is now posted the Commission's CESA webpage at <https://fgc.ca.gov/CESA> under "Active Petitions." To allow the required 30 days for public review, this item should be continued to the Commission's August 13-14, 2025 meeting.

**Significant Public Comments (N/A)****Recommendation**

***Commission staff:*** Under Agenda Item 1, continue this item to a future meeting.

**Exhibits (N/A)****Motion (N/A)**



## Staff Summary for June 11-12, 2025

**24. Morro Manzanita Take Provision****Today's Item****Information** ☐**Action** ☒

Receive a recommendation from the Department and consider authorizing publication of notice of intent to authorize take of Morro manzanita while a candidate species under the California Endangered Species Act, pursuant to Section 2084 of the California Fish and Game Code.

**Summary of Previous/Future Actions**

- |  |                         |
|--|-------------------------|
| • Morro manzanita officially became a candidate species under the California Endangered Species Act (CESA) | May 16, 2025            |
| • <b>Today's notice hearing</b>  | <b>June 11-12, 2025</b> |
| • Discussion hearing   | August 13-14, 2025      |
| • Adoption hearing   | October 8-9, 2025       |

**Background**

On July 20, 2024, the Commission received a petition to list Morro manzanita (*Arctostaphylos morroensis*) as endangered under CESA. At its April 2025 meeting, after review of the Department's petition evaluation report, comments received and discussion, the Commission determined that listing Morro manzanita may be warranted and instructed staff to issue a notice indicating that Morro manzanita is a candidate under CESA. On May 16, 2025, a notice was published in the California Regulatory Notice Register notifying the public that Morro manzanita is a candidate species and temporarily afforded the same protections as a fully listed species, pursuant to Fish and Game Code Section 2085.

During the evaluation phase of the petition, it was brought to the Commission's attention that a project that has completed environmental review in San Luis Obispo County is susceptible to an extensive delay if Morro manzanita were to become a candidate species. The county is undertaking a project to replace the South Bay Boulevard Bridge (No. 49C-0351) (project) so that the bridge meets current seismic design standards and maintains safe, reliable service of a critical access corridor for the Los Osos and Morro Bay communities.

The Department has worked with county public works to draft regulations to allow the county to proceed with its project to replace the South Bay Boulevard Bridge so that the bridge meets seismic design and safety standards. The county plans to issue bids for construction between summer and fall 2025; therefore, this project, while not an emergency, has strict timelines for compliance and to ensure that construction can commence for public safety reasons. The Department considers the restoration and mitigation measures laid out in a habitat mitigation and monitoring plan (HMMP) to adequately compensate for impacts to Morro manzanita from the South Bay Boulevard Bridge project (exhibits 5 and 7). The proposed regulations benefit the county by allowing it to proceed with the South Bay Boulevard Bridge project and may benefit Morro manzanita by creating a Morro manzanita mitigation site that, if successfully implemented, will increase the total area occupied by Morro manzanita.

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***Draft Proposed Regulations***

The draft proposed Section 749.14 would allow take of Morro manzanita during CESA candidacy for the bridge project, and represents the culmination of the Department's internal discussions with county public works staff. The draft regulations authorize the county to take Morro manzanita while undertaking the bridge project and associated mitigation and restoration actions, and lists the conditions the county must adhere to for the take authorization. The conditions require that the county comply with restrictions imposed by the U.S. Fish and Wildlife Service and the California Coastal Commission when those agencies reviewed the county bridge project. The conditions also require the county to comply with the negative declaration the county developed pursuant to CEQA. (Exhibits 5-7.)

Further details on the draft proposed regulations are available in the draft initial statement of reasons and draft proposed regulatory language (exhibits 2 and 3).

Today the Department will present an overview of the draft amendments (Exhibit 8).

**Significant Public Comments (N/A)****Recommendation**

***Commission staff:*** Authorize publication of intent to add Section 749.14 related to take of Morro manzanita during candidacy.

***Department:*** Authorize publication of notice of intent to add Section 749.14.

**Exhibits**

1. [Department memo transmitting the draft initial statement of reasons, received June 3, 2025](#)
2. [Draft initial statement of reasons](#)
3. [Proposed regulatory language](#)
4. [Economic and fiscal impact statement \(STD. 399\) and addendum](#)
5. [South Bay Boulevard Bridge Replacement biological opinion](#)
6. [South Bay Boulevard Bridge replacement coastal development permit](#)
7. [South Bay Boulevard Bridge Replacement HMMP](#)
8. [Department presentation](#)

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission authorizes publication of a notice of its intent to add Section 749.14, as discussed today.

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**25. Striped Bass****Today's Item****Information** ☐**Action** ☒

Consider authorizing publication of notice of intent to amend regulations regarding recreational striped bass harvest size limits.

**Summary of Previous/Future Actions**

- |  |                          |
|--|--------------------------|
| • Granted petition 2020-005 AM 1 in concept  | December 9-10, 2020      |
| • Granted petition 2022-12                   | December 14-15, 2022     |
| • Wildlife Resources Committee (WRC) vetting | Various 2023 - 2024; WRC |
| • <b>Today's notice hearing</b>              | <b>June 11-12, 2025</b>  |
| • Discussion hearing                         | August 13-14, 2025       |
| • Adoption hearing                           | October 8-9, 2025        |

**Background**

At its December 2020 meeting, the Commission granted petition 2020-005 AM 1 to potentially establish an inland waters slot limit for the harvest of striped bass. At its December 2022 meeting, the Commission granted a similar petition to establish a slot limit for the harvest of striped bass in marine waters, consistent with the inland slot limit request. The Department evaluated both petitions and presented its findings to WRC over the course of several meetings in 2023 and 2024 (see Exhibit 8). At its September 2024 meeting, WRC recommended that the Commission support a future rulemaking regarding striped bass slot limits from 18 to 30 inches (exhibits 1 and 2).

Consistent with the WRC recommendation, the Department requests that the Commission authorize a notice for proposed amendments to the striped bass regulations; the Department transmitted draft regulatory documents. The draft initial statement of reasons (ISOR; Exhibit 4) includes a detailed breakdown of the history of the striped bass fishery in California, the Department's public outreach efforts regarding striped bass regulations, its evaluation of the petitions for regulation change, and the rationale for its striped bass slot limit recommendation.

Existing regulations already establish – with a few exceptions – an 18-inch minimum size for harvest of striped bass in both inland and marine environments, as well as a bag and possession limit of two fish.

***Draft Proposed Regulations***

The draft proposed regulations, as detailed in exhibits 4 and 5, would amend sections 5.75 and 27.85 to add a maximum harvest size for striped bass of 30 inches, effectively creating a slot limit of 18 to 30 inches for the harvest of striped bass in both inland and marine environments. Striped bass regulations in non-anadromous waters, however, would not change. The recommendation aims to benefit both fishers and striped bass populations by creating a more robust trophy fishery, reducing recruitment overfishing, and allowing increased spawning by larger mature fish. The proposal also makes minor clarifying amendments to striped bass regulations.

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Overall, the proposal is to amend striped bass regulations to:

- Add a maximum harvest size limit of 30 inches for striped bass in both inland and marine waters;
- add a reference to the definition of anadromous waters in inland striped bass regulations;
- replace all references to a “minimum size limit” with a “harvest size limit;” and
- add language specifying that striped bass regulations in non-anadromous waters will remain at an 18-inch harvest size minimum and a bag and possession limit of two fish

Today the Department will present an overview of the draft proposed regulations (Exhibit 7).

### Significant Public Comments (N/A)

### Recommendation

**Commission staff:** Authorize publication of a notice of intent to amend regulations related to striped bass slot limits, as recommended by the Department and WRC.

**Committee:** Support the Department request for regulation amendments related to striped bass slot limits.

**Department:** Authorize publication of a notice of intent to amend regulations as detailed in the draft ISOR and draft proposed regulatory language.

### Exhibits

1. [Staff Summary for Agenda Item 2, September 12, 2024 WRC meeting \(for background purposes only\)](#)
2. [Department presentation from September 12, 2024 WRC](#)
3. [Department memo transmitting draft ISOR, received May 16, 2025](#)
4. [Draft ISOR](#)
5. [Draft proposed regulatory language](#)
6. [Draft economic and fiscal impact statement](#)
7. [Department presentation](#)
8. [California Department of Fish and Wildlife Evaluation of Regulation Change Petition 2022-12: Proposed 20–30–Inch Harvest Slot Limit for Striped Bass \(\*Morone saxatilis\*\), received August 29, 2024](#)

### Motion

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission authorizes publication of a notice of its intent to amend sections 5.85 and 27.85 related to slot limits for harvesting striped bass.

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**26. Wildlife Prosecutor of the Year for 2024****Today's Item****Information** ☒**Action** ☐

Announce Butte County Deputy District Attorney, Michael Tufaro, as the recipient of the Commission's annual Wildlife Prosecutor of the Year award.

**Summary of Previous/Future Actions (N/A)****Background**

The Commission's Wildlife Prosecutor of the Year policy seeks "...to honor a courtroom champion of California's fish, wildlife and natural resources, a person who tirelessly prosecutes fish, wildlife, natural resource and environmental crimes in California courts," and "...recognize this prosecutor through an annual Wildlife Prosecutor of the Year Award" (Exhibit 1).

Specifically, the award recognizes a prosecuting attorney who exhibits one or more of the following:

- (1) exceptional skill and an outstanding commitment to protecting California's fish, wildlife and natural resources;
- (2) superior performance in prosecuting wildlife, natural resource and environmental crimes;
- (3) relentless pursuit of justice for the most egregious violators and keen ability to prosecute complex, controversial or landmark cases; and/or
- (4) exemplary work promoting and maintaining a collaborative working relationship with wildlife officers in pursuit of conserving our natural resources.

Consistent with the policy, the Department's Law Enforcement Division (LED) makes up to four nominations recommended by staff that regularly work with the various prosecuting attorneys' offices. The recipient is selected by the Commission president and executive director with the Department director and deputy director for LED. The Commission presents the selected attorney with the award, which honors those attorneys who went above and beyond to prosecute wildlife crimes in the previous three years. The individual is also recognized during an event that includes their colleagues and peers.

***Recipient for 2024***

This year, the Commission honors Deputy District Attorney (DDA) Michael Tufaro from Butte County. Exhibit 2 provides details on DDA Tufaro's effective efforts to prosecute violators in Northern California for egregious acts against wildlife and the environment. Throughout his ten-year career with the Butte County District Attorney's Office, DDA Tufaro has dedicated his personal and professional time educating defense attorneys and prosecuting attorneys throughout California who deal with natural resource crimes and successful prosecution strategies. He has worked tirelessly and collaboratively with Department wildlife officers to effectively prosecute numerous high-profile cases of individuals for unpermitted cannabis cultivation, illegal importation of restricted species, animal cruelty, illegal possession of firearms, poaching, and seizure of conveyances used in the commission of wildlife crimes. DDA Tufaro's efforts have set a high bar for future and ongoing prosecution of individuals

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accused of similar unlawful conduct. The Commission and Department congratulate DDA Tufaro on this esteemed award.

**Significant Public Comments (N/A)****Recommendation (N/A)****Exhibits**

1. [Commission Wildlife Prosecutor of the Year Policy](#)
2. [CDFW Memo, Nomination for DDA Michael Tufaro, received May 23, 2025](#)

**Motion (N/A)**

## Staff Summary for June 11-12, 2025

**27. Regulation Change Petitions (Wildlife and Inland Fisheries)****Today's Item**Information ☐Action ☒

This is a standing agenda item for the Commission to receive new regulation change petitions and act on regulation change petitions received from the public at previous meetings. For this meeting:

- (A) Receive new petitions for regulation change
- (B) Act on previously received regulation change petitions
- (C) Comments received on referred petitions not yet scheduled for action

**Summary of Previous/Future Actions****(A) *Petitions for Regulation Change - Scheduled for Action***

- Received Petition 2025-03 April 16-17, 2025
- **Today potentially act on petition June 11-12, 2025**

**(B) *New Petitions for Regulation Change - Receipt***

- Today receive new petitions April 16-17, 2025
- **Potentially act on new petitions June 11-12, 2025**

**(C) *Comments Received on Referred Petitions (N/A)*****Background****(A) *Petitions for Regulation Change - Scheduled for Action***

Petitions received at the previous meeting are scheduled for Commission consideration at the next regularly scheduled business meeting. A petition may be (1) denied, (2) granted, or (3) referred to a Commission committee, staff, legal counsel, or the Department for further evaluation or information gathering. Referred petitions are scheduled for action once a recommendation is received. Today, one petition is scheduled for action:

- I. *Petition 2025-03*: Request to remove ferrets from the restricted species list.

**(B) *New Petitions for Regulation Change - Receipt***

Pursuant to Section 662, any person requesting that the Commission adopt, amend, or repeal a regulation must complete and submit form FGC 1. Regulation change petition forms submitted by the public are "received" at this Commission meeting if they are delivered by the public comment or supplemental comment deadlines or delivered in person to the Commission meeting.

Under the Bagley-Keene Open Meeting Act, the Commission cannot discuss or act on any matter not included on the agenda, other than to determine whether to schedule issues raised by the public for consideration at future meetings. Thus, petitions for regulation change generally follow a two-meeting cycle of receipt and decision. The Commission will

## Staff Summary for June 11-12, 2025

act on petitions received at today's meeting at the next regularly-scheduled Commission meeting (June 11-12, 2025) following staff evaluation, unless the petition is rejected under the 10-day staff review as prescribed in subsection 662(b).

The Commission received one new petition for regulation change by the comment deadline; the petition is summarized in Exhibit B1 and provided as Exhibit B2.

### **(C) Comments Received on Referred Petitions**

This agenda sub-item is for receiving public comments for any petition previously-referred for review and recommendation, but not yet ready for Commission action. Action on any referred petition will be scheduled once the Commission receives a recommendation.

Today, there are no comments on previously referred petitions.

### **Significant Public Comments**

#### *Support for Petition 2025-03*

1. Two commenters, a ferret nonprofit educational online organization and a biological survey organization provided additional research papers to supplement the petition (example letter included as Exhibit A2).
2. Sixty-two commenters submitted a form email stating ferrets are not wild, not detrimental, and have "never had a hearing" (example email in Exhibit A3).
3. Twenty commenters express support for legalizing ferrets, some sharing personal stories of the benefits owning ferrets has had for them. Reasons stated for legalizing ferrets as pets in California include: ferrets are already domesticated; they are no more detrimental to the environment than other pets like cats and dogs; legalizing ferrets would align with other states' laws; and legalizing ferrets could boost the state's economy. Example emails are provided as exhibits A4 through A8.
4. Sixteen commenters submitted a form comment letter adding their support for Petition 2025-03, with some providing personal stories of the benefits of ferret ownership (example email provided as Exhibit A9).
5. Two commenters submitted a form comment letter, emphasizing that (1) ferrets are domesticated; (2) pet ferrets in California are not receiving adequate veterinary care because pet owners fear their pet would be confiscated; and (3) there are studies suggesting ferrets do not cause environmental harm (example email provided as Exhibit A10).

### **Recommendation**

**Commission staff:** Refer Petition 2025-03 to the Department for review and recommendation.

### **Exhibits**

- A1. [Petition 2025-03, received April 16-17, 2025.](#)
- A2. [Email from F.A. Hoffman, CEO, allFerrets, received April 10, 2025](#)
- A3. [Example form email from Sandra Losito, received May 5, 2025](#)



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- A4. [Email from Chelsea Cook, received May 15, 2025](#)
- A5. [Email from Johnny Morfin, received May 5, 2025](#)
- A6. [Email from Bryan Murcia, received May 20, 2025](#)
- A7. [Email from Kyle Klepach, received April 15, 2025](#)
- A8. [Email from Sabine van Hoorn, World Ferret Union and Han de Vries, World Ferret Information Centre, received April 29, 2025](#)
- A9. [Email from Carol J. Owens, received April 27, 2025](#)
- A10. [Letter from Norely Diaz, received April 10, 2025](#)
- B1. [Summary of new petitions for regulatory change received through May 29, 2025](#)
- B2. [Petition 2025-04, received April 15, 2025](#)

### **Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the staff recommendation to refer Petition 2025-03 to the Department for review and recommendation.

## Staff Summary for June 11-12, 2025

**28. Non-Regulatory Requests from Previous Meetings (Wildlife and Inland Fisheries)****Today's Item**Information ☐Action ☒

Consider and potentially act on non-regulatory requests submitted by members of the public at previous meetings.

**Summary of Previous/Future Actions**

- Commission received requests April 16-17, 2025
- **Today potentially act on requests June 11-12, 2025**

**Background**

Requests for non-regulatory action are received from members of the public under general public comment. All non-regulatory requests follow a two-meeting cycle to ensure proper review and thorough consideration of each item. All requests received in writing or public testimony during general public comment at the previous Commission meeting are scheduled for consideration at the next regular meeting. Non-regulatory requests that have been referred to staff, legal counsel, a committee, or the Department for review and recommendation are scheduled for action once a recommendation has been received.

Three non-regulatory requests received in April are scheduled for action today. Exhibit 1 provides the staff recommendations and rationales, developed with input from the Department.

**Significant Public Comments (N/A)****Recommendation**

**Commission staff:** Adopt the staff recommendations for the non-regulatory requests as reflected in Exhibit 1.

**Exhibits**

1. [Summary of non-regulatory requests and staff recommendations scheduled for action, updated May 21, 2025.](#)

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the staff recommendation for action on the non-regulatory request as reflected in Exhibit 1.

**OR**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the following action regarding the non-regulatory request: \_\_\_\_\_.

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**29A. Wildlife Resources Committee (WRC)****Today's Item****Information** ☐**Action** ☒

Receive summary and consider approving any recommendations from the May 15, 2025 Committee meeting. Discuss referred topics and consider revisions to topics and timing.

**Summary of Previous/Future Actions**

- |   |                         |
|---|-------------------------|
| • Previous WRC meeting                                | May 15, 2025; WRC       |
| • <b>Today consider approving WRC recommendations</b> | <b>June 11-12, 2025</b> |
| • Next WRC meeting                                    | September 11, 2025; WRC |

**Background**

WRC works under Commission direction to set and accomplish its work plan (Exhibit 1). Today, the Commission will receive a report on the previous WRC meeting as well as provide direction for any referred topics and revisions to WRC topics and timing.

***Previous Committee Meeting***

WRC met on May 15 in Sacramento, with Zoom and phone options. Official meeting minutes are posted on the [Commission's YouTube page](#), with a link also available on the Commission's meetings page at [fgc.ca.gov/meetings](http://fgc.ca.gov/meetings). An abbreviated summary is included in this document.

***Annual Regulation Changes***

The Committee discussed waterfowl hunting, Central Valley sport fishing, and Klamath River Basin sport fishing. Topics included low salmon abundances on the Klamath, recent closures, and the potential for recolonization of previously above-dam river stretches.

***Periodic Regulation Changes***

- Upland (Resident) Game Bird Hunting

The Department summarized pheasant hunting survey results, indicating that most hunters are not interested in regulatory changes at this time.

- Big Game Hunting

Deer hunting discussions covered the deer management plan, connectivity issues, chronic wasting disease, and community science. WRC requested additional information from the Department regarding connectivity and community science.

Elk hunting discussions revolved around equity of hunting tags for all Californians regardless of financial means, increasing elk populations and resulting conflict, incentivizing large landowners and businesses to share access, the role of predators, and ways to encourage hunters to take more cows.

Regarding bighorn sheep, the Department responded to a question about the presence of domestic sheep at the White Mountain Research Center, a unit of the University of

## Staff Summary for June 11-12, 2025

California Natural Reserve System and the UCLA Institute of the Environment and Sustainability that fosters scientific and educational advancement in the Eastern Sierra.

For pronghorn antelope, the Department noted that it requested the Commission reduce hunting tags over the last two regulatory cycles and continues to monitor and evaluate tag types. Serious habitat concerns for pronghorn remain.

- Black Bear Hunting

The Department presented information on black bear hunting, noting that the harvest cap of 1,700 bears has not been met since 2012; last year's harvest was the lowest in 20 years. The Department is developing a survey, and public opinion information from the bear plan comments is available. The Department intends to recommend expanding the bear hunt area to include the state's northeast corner and has also received requests to allow two tags per person per season without increasing the harvest cap.

Participants discussed the Department's modelling efforts and the way in which bear population estimates are currently produced. They also discussed the limited evidence of a direct connection between hunting and bear depredations. Participant opinions varied on expanding bear hunting areas, allowing a second bear tag, hunting with dogs (currently outlawed), and bear hunting in general.

WRC expressed interest in receiving bear-human conflict data since 2017, and a presentation on how bear populations will be monitored going forward.

### *Take of Coyotes*

The co-chairs started the discussion by sharing with the public that no recommendation was presently being considered. Staff clarified the differences between statute, regulation and policy, and outlined key laws and policy related to take of coyote.

Many participants expressed gratitude to the Commission for referring the topic back to WRC for further discussion. Others expressed appreciation for an improved understanding of state laws and regulations, adding that it would have been more helpful to have the presentation in the materials distributed in advance of the meeting.

Those opposed to regulation changes for take of coyote cited: a perceived lack of clarity regarding the stated problem; the need to protect livestock, irrigation infrastructure, humans and pets; coyote impacts on other wildlife species (e.g., game species); and stable to increasing coyote populations and ranges. WRC heard numerous accounts of agricultural and ranching damage, and dangers to pets and people in urban environments caused by coyotes. Some participants objected to the term "indiscriminate" with coyote killing.

Those in support of coyote regulation changes cited: scientific evidence suggesting a lack of effectiveness in indiscriminately killing coyotes due to biological compensatory mechanisms; general public support for limiting carnivore take; the ecological importance of coyotes; successes with non-lethal methods for managing human conflicts; and practical ecological services provided by coyotes (e.g., rodent control). Some livestock ranchers and urban residents emphasized their success in curbing human/coyote conflict without lethal techniques.

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Some proponents of new regulations supported bag limits and/or seasons, while others advocated for more limitations. While some participants questioned a conflict between Section 472 of Title 14 and Commission policies, the sentiment that a conflict exists was common.

Department staff acknowledged that coyote management is highly complicated. Coyote is the fourth most common reported species in the wildlife incident reporting system, with an increasing trend observed primarily in urban settings. Nevertheless, the Department is prepared to provide any relevant data and information available to support WRC discussions.

Department staff also highlighted that the legal definition of “take” includes activities such as hazing and other non-lethal control and behavior modification methods. The definition should be considered when evaluating any changes to coyote regulations.

No formal recommendation was made.

### ***Committee Recommendations***

No recommendations were made by WRC.

### ***Committee Work Plan and Future Meetings***

The updated WRC work plan (Exhibit 1) outlines topics and timelines for Commission-referred items, including WRC- and staff-proposed changes.

The big game hunting topic is updated to list the big game species whose hunting regulations are being reviewed (deer, elk, pronghorn antelope, black bear, and Nelson bighorn sheep).

### **Significant Public Comments**

1. A commenter opposes trophy hunting of black bears and the use of hounds, bait, and spring hunting (Exhibit 2).
2. A commenter appreciates the coyote conversation at the last WRC and praises the presence of wildlife officers at the meeting (Exhibit 3).
3. The San Luis Obispo County Farm Bureau and two commenters oppose regulations limiting the take of coyotes (sample in Exhibit 4).

### **Recommendation**

***Commission staff:*** Approve the WRC work plan as reflected in Exhibit 1, including any changes identified during today’s meeting.

### **Exhibits**

1. [WRC work plan, updated May 16, 2025](#)
2. [Email from Richard Layne, received May 29, 2025](#)
3. [Letter from Lee White, received May 23, 2025](#)
4. [Letter from Paul Clark, Executive Director, San Luis Obispo County Farm Bureau, received May 13, 2025](#)

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**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission approves the changes to the work plan as presented in Exhibit 1 and discussed today.

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**29B. Department Wildlife and Fisheries Division, and Department Ecosystem Conservation Division**

**Today's Item**

Information ☒

Action ☐

Receive updates from Department divisions on items of note since the previous Commission meeting.

**Summary of Previous/Future Actions (N/A)**

**Background (N/A)**

**Significant Public Comments (N/A)**

**Recommendation N/A)**

**Exhibits**

1. [Department news release: CDFW Announces Release of Bighorn Sheep Conservation and Management Plan for California, dated April 25, 2025](#)
2. [Department news release: CDFW Seeks Public Comment on Draft Guidelines for Recovery Planning, dated May 30, 2025](#)

**Motion (N/A)**

## Staff Summary for June 11-12, 2025

**30B. Administrative Item – Rulemaking Timetable Updates****Today's Item**Information ☐Action ☒

Review and consider approving changes to the perpetual timetable for anticipated regulatory actions.

**Summary of Previous/Future Actions**

- Commission approved rulemaking timetable April 16-17, 2025
- **Today consider approving changes to the rulemaking timetable June 11-12, 2025**

**Background**

This is a standing agenda item for staff and the Department to request changes to the Commission's rulemaking timetable (Exhibit 2), confirm changes made by the Commission during this meeting, and highlight minor changes made by staff.

The Department requests six changes to the rulemaking timetable (Exhibit 1):

- Add a "Take of Morro Manzanita During Candidacy" rulemaking to add Section 749.14. This rulemaking is necessary to provide San Luis Obispo County an exception from the take prohibition during candidacy and the one-year status review period for a shovel-ready bridge replacement project. The proposed rulemaking schedule is notice in June 2025 (this meeting), discussion in August 2025, and adoption in October 2025.
- Add a "Recreational Red Abalone Closure Extension" rulemaking to amend Section 29.15. This rulemaking extends the red abalone fishery's sunset date by ten years in response to the existing population collapse. The proposed rulemaking schedule is notice in August 2025, discussion in October 2025, and adoption in December 2025.
- Add two 90-day "Commercial Coonstripe Shrimp Emergency" emergency readoption rulemakings to amend Section 180.15, for adoptions in August 2025 and October 2025. These rulemakings are necessary to maintain the emergency regulation that defines trap equipment restrictions in the coonstripe shrimp fishery to reduce marine life entanglement.
- Add a "Commercial Coonstripe Shrimp Fishery" rulemaking to amend Section 180.15. This "certificate of compliance" rulemaking is necessary to adopt the aforementioned emergency regulation through regular rulemaking. The proposed rulemaking schedule is notice in October 2025 and discussion/adoption in December 2025.
- Add an "Extend Bull Kelp Harvest Restriction Date" rulemaking to amend sections 165 and 165.5. This rulemaking would extend the temporary harvest restriction placed on bull kelp in Sonoma and Mendocino counties by three years while a kelp restoration management plan is finalized. The proposed rulemaking schedule is notice in August 2025 and discussion/adoption in October 2025.
- Add a "Donation of Sport-Caught Fish" rulemaking to amend Section 231. This rulemaking addresses a regulation change petition granted by the Commission to allow



## Staff Summary for June 11-12, 2025

sport fishing license holders to donate their fresh catch to specified non-profit organizations or groups. The proposed rulemaking schedule is notice in August 2025 and discussion/adoption in October 2025.

Staff requests two changes to the rulemaking timetable:

- Rename the “Golden Mussel Response – Restricted Species” rulemaking as “Golden Mussel, green crab, *Sinanodonta* and *Xenostrobus* – Restricted Species.” This change is necessary for consistency with published notice documents and to improve clarity about the purpose of the rulemaking.
- Add committee vetting and recommendations for several rulemakings as previously approved in committee work plans.

Staff may bring to today’s meeting additional proposed changes to the rulemaking timetable to further disperse workload.

### Significant Public Comments (N/A)

### Recommendation

**Commission staff:** Approve the proposed changes to the perpetual timetable for anticipated regulatory actions as identified in this staff summary and Exhibit 2, and any other changes identified during this meeting.

**Department:** Approve the proposed changes to the rulemaking timetable as identified in Exhibit 1.

### Exhibits

1. [Department memo, received June 3, 2025](#)
2. [“Perpetual Timetable for Anticipated Regulatory Actions,” dated June 3, 2025](#)

### Motion

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission approves the proposed changes to the perpetual timetable for anticipated regulatory actions as recommended and discussed today.

## Staff Summary for June 11-12, 2025

**30C. Potential Meeting Dates for 2027****Today's Item****Information** ☒**Action** ☐

Review and provide feedback on draft meeting dates for 2027 as proposed by staff.

**Summary of Previous/Future Actions**

- |  |                         |
|--|-------------------------|
| • <b>Discuss proposed 2027 meeting dates</b>         | <b>June 11-12, 2025</b> |
| • Discuss and potentially approve 2027 meeting dates | August 13-14, 2025      |

**Background**

The Commission currently conducts its business at six 2-day meetings (February, April, June, August, October, and December) on a Wednesday and Thursday, plus a teleconference meeting in May and others as needed. Committees each generally hold three meetings per year (half-day to full-day and, occasionally, two full days).

In 2025, committee meetings have been held either between Commission business meetings (Wildlife Resources Committee [WRC] on Thursdays in January, May and September and Marine Resources Committee [MRC] on Thursdays in March, July and November), or the afternoon before the first day of a Commission meeting (Tribal Committee [TC] on Tuesdays). Staff seeks guidance on whether to retain the same months and days of week for Commission and committee meetings.

Adequate meeting facilities have become more difficult to secure, and advanced planning increases the likelihood of locating suitable and available venues. Thus, to ensure staff has adequate time to identify and secure venue options that meet the Commission's requirements related to cost, information technology and security conditions, as well as State-mandated bids, contracting conditions and timelines, it is important for meeting dates and locations to be identified well in advance.

A list of proposed 2027 meeting dates (Table 1) is presented for Commission consideration and discussion today, with potential approval in August. Staff developed the proposed meeting dates accounting for State holidays, other relevant meeting schedules, and regulatory deadlines. In light of the State's current and expected ongoing budget deficit, staff propose Sacramento area meeting locations to reduce costs to the state.

For this year's Commission meetings, wildlife and inland fisheries items are heard on the first day, and marine items are heard the second day. For 2026, the subject matter will rotate such that marine items are heard on the first day, and wildlife and inland fisheries items on the second day, with a new rotation implemented in 2027.

Please note the following when reviewing the 2027 proposed meeting dates:

- The January WRC meeting is on the Thursday before a three-day weekend.
- The February Commission meeting is the week after a three-day weekend.

## Staff Summary for June 11-12, 2025

- The June Commission meeting is during graduation season and the proposed dates were selected to not overlap with the June Pacific Fishery Management Council meeting (6/16-22).
- The November MRC meeting is proposed for November 18, recognizing Pacific Fishery Management Council has not scheduled its November meeting yet.

**Table 1: Proposed 2027 Commission and Committee Meeting Dates**

<b>Proposed Dates</b>	<b>Meeting Type</b>
January 14	WRC
February 17-18	Commission
March 18	MRC
April 13	TC
April 14-15	Commission
May 6	Commission
May 13	WRC
June 9-10	Commission
July 15	MRC
August 17	TC
August 18-19	Commission
September 16	WRC
October 13-14	Commission
November 18	MRC
December 14	TC
December 15-16	Commission

**Other Relevant 2027 Meetings and Locations**

- Association of Fish and Wildlife Agencies
  - Sep 2027 – Date and location unknown at this time
- Pacific Fishery Management Council

## Staff Summary for June 11-12, 2025

- Mar 4-10, 2027 – Pacific Northwest (specific location unknown at this time)
- Apr 6-12, 2027 – Northern California
- Jun 16-22, 2027 – Rohnert Park, CA
- Sep 2027 – Dates and location unknown at this time
- Nov 2027 – Dates and location unknown at this time
- Pacific Flyway Council
  - Dates and locations unknown at this time
- Western Association of Fish and Wildlife Agencies
  - Dates and locations unknown at this time
- Wildlife Conservation Board (all held in Sacramento, CA)
  - Dates and locations unknown at this time

**Significant Public Comments (N/A)****Recommendation*****Commission staff:***

- (1) Confirm intent to schedule Commission meetings on a Wednesday and Thursday in February, April, June, August, October and December;
- (2) confirm intent to schedule MRC meetings on Thursdays, WRC meetings on Thursdays, and TC meetings on Tuesdays immediately prior to Commission meetings; and
- (3) provide direction on proposed 2027 dates.

**Exhibits (N/A)****Motion (N/A)**

## Staff Summary for June 11-12, 2025

**30D. Administrative Items - Future Meetings and New Business****Today's Item**Information ☐Action ☒

This is a standing agenda item to review logistics and approve draft agenda items for the next Commission meetings, consider any changes to approved meeting dates or locations, or introduce new business for a future meeting agenda.

**Summary of Previous/Future Actions (N/A)****Background*****Upcoming Commission Meetings***

The next regular Commission meeting is scheduled for August 13-14, 2025 in Sacramento with Zoom and phone options for public participation.

For all Commission and committee meetings, we continue to provide the ability to participate via webinar and phone, in addition to physical meeting locations.

Potential agenda items for the August meeting are provided in Exhibit 1 for consideration and potential Commission approval.

***Approved Meeting Dates and Locations***

Currently, Commission and committee meetings are scheduled for the Sacramento area through December 2025 due to ongoing travel restrictions and budget constraints. Given the continued challenges of the 2025-26 state budget, this is expected to continue.

**Significant Public Comments (N/A)****Recommendation**

***Commission staff:*** Approve agenda items for the August 13-14, 2025 meeting as presented in Exhibit 1 and amended during this meeting.

**Exhibits**

1. [Potential agenda items for the August 13-14, 2025 Commission meeting](#)

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission approves the draft agenda items for the August 13-14, 2025 Commission meeting, as amended during this meeting

## Staff Summary for June 11-12, 2025

**31. General Public Comment for Items Not on the Agenda****Today's Item****Information** ☒**Action** ☐

Receive public comment regarding topics within the Commission's authority that are not included on the agenda.

**Summary of Previous/Future Actions**

- **Today receive written and verbal comments and requests** **June 11-12, 2025**
- Consider granting, denying, or referring **August 13-14, 2025**

**Background**

This item is to provide the public an opportunity to address the Commission on topics not on the agenda. Staff may include written materials and comments received prior to the meeting as exhibits in the meeting binder (if received by the written comment deadline), or as supplemental comments at the meeting (if received by the supplemental comment deadline).

General public comments are categorized into two types: (1) requests for non-regulatory action and (2) informational-only comments. Under the Bagley-Keene Open Meeting Act, the Commission cannot discuss or take action on any matter not included on the agenda, other than to schedule issues raised by the public for consideration at future meetings. Thus, non-regulatory requests generally follow a two-meeting cycle (receipt and direction); the Commission will determine the outcome of non-regulatory requests received at today's meeting at the next regularly scheduled Commission meeting, following staff evaluation (currently August 13-14, 2025).

**Significant Public Comments (N/A)****Recommendation**

**Commission staff:** Consider whether to add any future agenda items to address issues that are raised during public comment.

**Exhibits**

1. [See exhibits for Agenda Item 2](#)

**Motion (N/A)**

Signed original on file,  
Received May 16, 2025

## Memorandum

Date: May 1, 2025

To: Melissa Miller- Henson  
Executive Director  
Fish and Game Commission

From: Charlton H. Bonham  
Director

Subject: **Agenda Item for the June 11-12, 2025 Fish and Game Commission Meeting  
Private Lands Wildlife Habitat Enhancement and Management (PLM) Area  
Licenses**

California Fish and Game Code Section 3406(c) requires that the activities conducted pursuant to each Private Lands Wildlife Habitat Enhancement and Management Plan (PLM) shall be reviewed annually by the Department of Fish and Wildlife (Department) and by the Fish and Game Commission (Commission) at a public hearing. Licenses for such areas may be granted by the Commission for a period of five (5) years following department review and approval of the management plan (Title 14, California Code of Regulations Section 601(a)).

The Department has reviewed the Initial management plans for 10 new properties in 9 counties consisting of approximately 26,725 acres and the 5-year renewals for 12 properties in 7 counties consisting of approximately 72,255 acres. Additionally, the Department has reviewed the annual reports for 43 properties in 13 counties consisting of approximately 285,736 acres.

The Department recommends that the Commission approve the wildlife management plans, applications, and each 2025/26 harvest program under conditions specified in the attached tables. Habitat improvements accomplished under these plans will enhance and maintain wildlife resources on and around the PLM areas. The goals and objectives stated in the management plans are compatible with Department management plans for appropriate species in these areas.

The attached tables represent the second, and final, list of PLM properties recommended for approval by the Commission in 2025. We previously recommended a first list of PLM properties for approval at the April 16, 2025, Commission meeting.

If you have any questions, please contact Ms. Victoria Barr at [REDACTED] or by email at [REDACTED]

Melissa Miller-Henson, Executive Director  
Fish and Game Commission  
May 1, 2025  
Page 2

Attachment

ec: Chad Dibble, Deputy Director  
Wildlife and Fisheries Division

[REDACTED]

Scott Gardner, Branch Chief  
Wildlife Branch

[REDACTED]

Mario Klip, Environmental Program Manager  
Wildlife Branch

[REDACTED]

Victoria Barr, Environmental Scientist  
Wildlife Branch

[REDACTED]



***PLM AREA LICENSE  
INITIAL MANAGEMENT PLANS, 2025-2029  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>NORTHERN REGION</b>		
<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Baccala Ranch</p> <p>Deer Zone C4</p> <p>Tehama</p> <p>5,956 Acres</p>	<p>Authorized Harvest: 5 forked horn or better buck deer</p> <p>Issue 5 buck deer tags for the period of September 20, 2025 through October 5, 2025.</p>	<p>Install wildlife friendly fencing around the perimeters of 3 natural springs.</p> <p>Install 2 guzzlers to collect rainwater to provide water for wildlife during dry periods.</p> <p>Create 20 brush piles for wildlife habitat. Each pile will be at least 15 feet in diameter and 6 feet tall.</p> <p>Remove at least 1.25 miles of old unused fencing.</p>
<p>Blodgett Ranch</p> <p>Deer Zone C3</p> <p>Shasta</p> <p>2,440 Acres</p>	<p>Authorized Harvest: 5 forked horn or better buck deer</p> <p>Issue 6 buck deer tags for the period of September 20, 2025 through October 26, 2025.</p>	<p>Install wildlife friendly fencing around at least 1 natural spring annually. Fenced area around the springs will be at least 24 feet by 24 feet.</p> <p>Spray at least 14 acres of yellow star thistle.</p> <p>Manage oak woodlands to maintain oaks for mast production, retain down and standing dead trees for wildlife habitat. No commercial wood cutting.</p> <p>Create at least 3 brush piles annually measuring at least 12 feet in diameter and 8 feet tall.</p> <p>Remove feral horses from the property.</p> <p>Remove at least 0.25 miles of old non-wildlife friendly fencing annually. Any fencing that needs to be replaced will be wildlife friendly.</p> <p>Broadcast California Native Grassland Seed Mix on at least 14 acres at a rate of 70 pounds per acre.</p> <p>Develop at least 2 food plots for wildlife. All plots will be at least 2 acres in size.</p>

***PLM AREA LICENSE  
INITIAL MANAGEMENT PLANS, 2025-2029  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
<p>Clover Creek Ranch</p> <p>Deer Zone C3</p> <p>Shasta</p> <p>880 Acres</p>	<p>Authorized Harvest: 3 forked horn or better buck deer</p> <p>Issue 3 buck deer tags for the period of September 20, 2025 through October 26, 2025.</p>	<p>Maintain at least 150 acres of thermal hiding cover area on the north facing slope south of Clover Creek.</p> <p>Create at least 2 water catchment ponds to provide water for wildlife and sub irrigate and possibly pipe to areas for longer green forage availability.</p> <p>Maintain 25 wood duck boxes on Clover Creek.</p> <p>Maintain 5 ponds in an area of the ranch that does not currently have water to encourage less cattle use of riparian areas, at least 5 more ponds will be added.</p> <p>Plant 4 food plots including 3 dryland and 1 irrigated food plot of at least 1 acre, another will be irrigated and will total at least 3 acres. These will be fenced off from any livestock.</p> <p>Continue reducing erosion and control sediment from entering Clover Creek by creating water bars on graded dirt roads and adding crushed rocks. .</p> <p>Manage grazing intensity to less than 70 pairs and graze between December 1, 2025 through May 1, 2026 to provide forage for wildlife.</p>

***PLM AREA LICENSE  
INITIAL MANAGEMENT PLANS, 2025-2029  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>NORTH CENTRAL REGION</b>		
<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Honcut Hills Ranch</p> <p>Deer Zone D3</p> <p>Butte</p> <p>980 Acres</p>	<p>Authorized Harvest: 2 forked horn or better buck deer</p> <p>Issue 2 buck deer tags for the archery period of August 16, 2025 through September 7, 2025 and the general rifle period of September 27, 2025 through November 2, 2025.</p>	<p>Construct 1 wildlife only water hole at Long Ravine.</p> <p>Plant 4 coyote brush and 4 buck brush around water hole at Long Ravine.</p> <p>Fence off water hole and brush plantings.</p> <p>Repair not less than 0.50 acre of dredged area for wildlife habitat.</p> <p>Place 2 wood duck boxes.</p> <p>Construct not less than 5 brush piles at a minimum of 10 feet x 10 feet x 6 feet.</p> <p>Limit grazing to 110 head of cattle or less. Grazing will occur Dec 1-May 1.</p> <p>Place at least 2 game cameras to monitor wildlife.</p>
<p>O'Brien and Prairie Creek</p> <p>Deer Zone D3</p> <p>Yuba, Butte</p> <p>2,300 Acres</p>	<p>Authorized Harvest: 6 forked horn or better buck deer</p> <p>Issue 6 deer tags to take forked horn or better buck deer for the archery period of August 16, 2025 through September 7, 2025 and the general rifle period of September 27, 2025 through November 2, 2025.</p>	<p>Cattle grazing will be eliminated from Prairie Creek Ranch.</p> <p>Cattle grazing on the O'Brien Ranch will be reduced from 250 cow / calf to 150.</p> <p>Maintain the cattle ex-closure around O'Brien bass pond.</p> <p>Plant 25 blue oak acorns west of Butte Marsh in red soil.</p> <p>Plant 50 valley oak acorns around the Butte Marsh perimeter.</p> <p>Plant 50 black arroyo willow cuttings around Butte Marsh.</p> <p>Plant 50 arroyo willow cuttings in the O'Brien Ranch bass pond cattle ex-closure.</p>

***PLM AREA LICENSE  
INITIAL MANAGEMENT PLANS, 2025-2029  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
O'Brien and Prairie Creek Cont.		<p>Plant 13 acres of corn in the John Deere Field.</p> <p>Plant 7 acres corn in the Triangle Field.</p> <p>Plant 5 acres corn in #1 teeth.</p> <p>Plant 6 acres safflower in Bass Pond ex-closure.</p> <p>Plant 5 acres sudex / milo below square pond O'Brien Ranch.</p> <p>Plant 1 acre of sub clover mix in O'Brien Ranch ex-closure.</p> <p>Plant 10 acres safflower in the John Deere Field.</p> <p>Widen the created flow through area by 5 acres that it can be flooded and irrigated.</p> <p>Create 2 new loafing islands in excavation zones.</p> <p>Create 10 new brush piles on the Quail Hill upland at a minimum of 15 feet in diameter x 6 feet tall.</p> <p>Create 10 new brush piles in O'Brien Ranch Bass Pond at a minimum of 15 feet in diameter x 6 feet tall.</p> <p>Thin out 2 acres of blackberry below Quail Hill.</p> <p>Burn 5 acres of tulles on both ranches around wetlands.</p> <p>Build 2 new flow ditches to aid in irrigation of milo, sudex, and sub clover food plots between the square pond and the small bass pond.</p> <p>Plant 1 acre of sub clover in the O'Brien Ranch ex-closure.</p>

***PLM AREA LICENSE  
INITIAL MANAGEMENT PLANS, 2025-2029  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Table Mountain Ranch</p> <p>Deer Zone D3</p> <p>Butte</p> <p>499 Acres</p>	<p>Authorized Harvest: 3 forked horn or better buck deer</p> <p>Issue 3 buck deer tags for the archery period of August 16, 2025 through September 7, 2025 and the general rifle period of September 27, 2025 through November 2, 2025.</p> <p>1 buck deer tag will be issued to a junior.</p>	<p>Construct 1 year-round wildlife only water hole and fence perimeter.</p> <p>Cut/remove/masticate 1 acre of large brush to promote new growth.</p> <p>Remove the fence along the driveway above the creek.</p> <p>Construct and place 2 wood duck boxes.</p> <p>Construct not less than 5 brush piles measuring at least 15 feet in diameter and 6 feet tall.</p> <p>A maximum of 60 head of cattle or less will be grazed. Grazing will occur December 1, 2025 through May 1, 2026.</p> <p>Place and monitor not less than 2 game cameras to monitor wildlife.</p> <p>Conduct 2 deer surveys.</p>
<p>Turkey Track Ranch</p> <p>Deer Zone A</p> <p>Colusa</p> <p>2,575 Acres</p>	<p>Authorized Harvest: 4 forked horn or better buck deer</p> <p>Issue 4 deer tags to take 4 forked horn or better buck deer for the archery period of July 12, 2025 through August 3, 2025 and the general rifle period of August 9, 2025 through September 21, 2025.</p>	<p>Begin installation of wildlife-friendly fencing between 2 wet ponds, set steel corner braces and gate portals in year one.</p> <p>Spray approximately 110 acres to abate noxious weeds and invasive star thistle on the western boundary of the property.</p> <p>Install and maintain one 200-gallon guzzler on the north end of Telegraph Ridge.</p> <p>Remove at least 100 yards of rusted barbed wire fencing to reduce wildlife entanglements.</p> <p>Create at least two brush piles measuring at least 8 feet in diameter and 6 feet high.</p> <p>Install 1 wood duck box.</p>

**PLM AREA LICENSE**  
**INITIAL MANAGEMENT PLANS, 2025-2029**  
**PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS**

<b>CENTRAL REGION</b>		
<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
Elk Run Ranch Deer Zone A  San Luis Obispo 635 Acres	Authorized Harvest: 4 forked horn or better buck deer and 6 turkey  Issue 4 buck deer tags for the period of August 9, 2025, through September 21, 2025.  Issue 3 either-sex turkey tags for the period of November 9, 2025, through December 8, 2025.  Issue 3 bearded turkey tags for the period of March 29, 2025, through May 4, 2025.	Seed grassland areas with specific seed mix to promote grazing and promote wildlife habitat.  Create brush piles for quail habitat.  Install waterfowl boxes to improve the habitat for waterfowl.  Install wildlife friendly water troughs and maintain existing cattle and wildlife troughs.  Install and maintain external fence lines.  Foster regenerative oak forestation as basis for ecosystem wide feed source, fence off young trees to prevent predation.  Remove legacy dilapidated cross fencing where present.  Remove installed cross fencing for improved livestock and wildlife passage.  Maintain existing levees to provide maximum rainfall storage.  Build rockpiles to promote habitat for native insects, reptiles and arachnids.
Parrish Pozo Ranch Deer Zone A  San Luis Obispo 1,535 Acres	Authorized Harvest: 1 antlerless elk, 3 forked horn or better buck deer, 3 turkeys, and 200 quail  Issue 1 antlerless elk tag for the period of November 9, 2025 through December 1, 2025.  Issue 3 either-sex turkey tags for the period of November 9,	Remove most interior cross fencing.  Install 1 new trough and start installation of a guzzler.  Install 2 wood duck boxes.  Treat 1-5 acres of yellow star thistle. Install 1 elk crossing.  Install 2 turtle basking structures in ponds.

**PLM AREA LICENSE**  
**INITIAL MANAGEMENT PLANS, 2025-2029**  
**PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS**

PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
Parrish Pozo Ranch Cont.	<p>2025, through December 8, 2025.</p> <p>Issue 200 quail seals for the Q3 season.</p> <p>Issue 1 antlerless elk tag for the period of November 9, 2025 through December 1, 2025.</p> <p>Elk tags will be issued when existing PLMs do not request their full authorized harvest and tags are available.</p>	<p>Install 1 mile of exterior wildlife friendly fence.</p> <p>Install 2 or more brush piles adjacent to water sources.</p> <p>Work with Cal Fire on potential controlled burn.</p> <p>Plant food plots for quail, dove, deer and elk.</p>
<p>Van Boxel Ranch</p> <p>Deer Zone A</p> <p>King, Fresno, Monterey Counties</p> <p>8,925 Acres</p>	<p>Authorized Harvest: 12 either-sex deer</p> <p>Issue 12 either-sex deer tags for the period of July 12, 2025 through August 3, 2025 for archery hunting and August 9, 2025 through September 9, 2025 for rifle hunting.</p>	<p>Inspect and plant forage plots if seed bank did not recruit from previous season. Target approximately 40 acres of forage habitat each year.</p> <p>Maintain operational status of springs, wells, troughs, and ponds.</p> <p>Manage invasive plant species across the ranch, including preventing yellow star thistle infestations, preventing juniper monoculture establishment, and controlling new populations of invasive plants as they are observed.</p> <p>Identify and rest pastures from grazing for the purpose of wildlife habitat enhancement and increased resource availability for wildlife.</p> <p>Add 2 owl boxes across the Ranch.</p> <p>Improve water source for wildlife in Deer Valley by adding a holding tank and a trough to provide water longer into the summer months.</p> <p>Initiate a relationship with CalFire to prepare for potential control burn projects in future PLM applications.</p>

Signed original on file,  
Received May 16, 2025

## Memorandum

Date: May 1, 2025

To: Melissa Miller- Henson  
Executive Director  
Fish and Game Commission

From: Charlton H. Bonham  
Director

Subject: **Agenda Item for the June 11-12, 2025 Fish and Game Commission Meeting  
Private Lands Wildlife Habitat Enhancement and Management (PLM) Area  
Licenses**

California Fish and Game Code Section 3406(c) requires that the activities conducted pursuant to each Private Lands Wildlife Habitat Enhancement and Management Plan (PLM) shall be reviewed annually by the Department of Fish and Wildlife (Department) and by the Fish and Game Commission (Commission) at a public hearing. Licenses for such areas may be granted by the Commission for a period of five (5) years following department review and approval of the management plan (Title 14, California Code of Regulations Section 601(a)).

The Department has reviewed the Initial management plans for 10 new properties in 9 counties consisting of approximately 26,725 acres and the 5-year renewals for 12 properties in 7 counties consisting of approximately 72,255 acres. Additionally, the Department has reviewed the annual reports for 43 properties in 13 counties consisting of approximately 285,736 acres.

The Department recommends that the Commission approve the wildlife management plans, applications, and each 2025/26 harvest program under conditions specified in the attached tables. Habitat improvements accomplished under these plans will enhance and maintain wildlife resources on and around the PLM areas. The goals and objectives stated in the management plans are compatible with Department management plans for appropriate species in these areas.

The attached tables represent the second, and final, list of PLM properties recommended for approval by the Commission in 2025. We previously recommended a first list of PLM properties for approval at the April 16, 2025, Commission meeting.

If you have any questions, please contact Ms. Victoria Barr at [REDACTED] or by email at [REDACTED].



Melissa Miller-Henson, Executive Director  
Fish and Game Commission  
May 1, 2025  
Page 2

Attachment

ec: Chad Dibble, Deputy Director  
Wildlife and Fisheries Division

[REDACTED]

Scott Gardner, Branch Chief  
Wildlife Branch

[REDACTED]

Mario Klip, Environmental Program Manager  
Wildlife Branch

[REDACTED]

Victoria Barr, Environmental Scientist  
Wildlife Branch

[REDACTED]

**PLM AREA LICENSE  
5-YEAR RENEWALS, 2025-2029  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS**

<b>NORTHERN REGION</b>		
<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Alexandre Dairy PLM</p> <p>Del Norte</p> <p>1,728 Acres</p>	<p>Authorized Harvest: 2 bull elk and 4 antlerless elk</p> <p>Issue 2 bull elk tags for the period of August 1, 2025, through December 31, 2025.</p> <p>Issue 4 antlerless elk tags for the period of October 1, 2025, through December 31, 2025.</p> <p>On or before October 15, 2025, the licensee may request (in writing) up to 1 additional bull elk tag to complete the authorized harvest.</p> <p>On or before October 15, 2025, the licensee may request (in writing) up to 2 additional antlerless elk tags to complete the authorized harvest.</p> <p>In no case shall the number of tags issued be used to exceed the authorized harvest.</p> <p>The number of tag holders actively hunting shall not exceed the number of elk available to harvest.</p>	<p>Tryon Creek alcove creation project on lower Tryon Creek, project entails construction of 2 alcoves adjacent to the creek for fish habitat and velocity refuge.</p> <p>Removal of 11,600 feet of exclusionary fencing adjacent to Tolowa Dunes State Park and replace with a single wire fencing that will allow for free movement of wildlife.</p> <p>Removal and treatment of Himalayan blackberry and English Ivy of approximately 0.25 acres. Once invasive species are removed cottonwood trees will be planted in the area.</p> <p>5 bat boxes, 5 wood duck nesting boxes, 5 owl boxes and 3 raptor perches will be installed annually.</p>
<p>Big Bluff Ranch</p> <p>Deer Zone B5</p> <p>Tehama</p> <p>3,736 Acres</p>	<p>Authorized Harvest: 9 deer of which no more than 6 may be forked horn or better buck deer and 3 may be antlerless deer</p> <p>Issue 10 either-sex deer tags for the period of August 2, 2025, through November 30, 2025.</p>	<p>Maintain and improve the Red Bank Restoration Project improvements (native vegetation restoration of 30 acres along 3 miles of creek) by repairing any damage to the livestock control fencing and removing the infrastructure that is no longer needed to sustain the project.</p> <p>Install 2 water troughs that allow for wildlife use.</p>

***PLM AREA LICENSE  
5-YEAR RENEWALS, 2025-2029  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
Big Bluff Ranch Cont.	<p>No antlerless deer shall be harvested before September 15, 2025.</p> <p>No more than 7 buck deer may be harvested after October 26, 2024.</p>	<p>Maintain the water development at Miller Place as needed to provide water for wildlife by repairing any damage to the system.</p> <p>Maintain the wildlife-friendly fence below Sunflower Dam to exclude livestock and allow wildlife access to wetlands.</p> <p>Participate in the Sunflower Coordinated Resource Management Program, which is working, in part, to improve wildlife habitat on the surrounding 40,000 acres.</p> <p>Continue to participate in the CAL FIRE Vegetation Management Program to manage mixed chaparral fuels, enhance wildlife habitat, and reduce exotic weeds. Proposed burn will be at least 800 acres and at least 4 acres annually.</p>
<p>Five Dot Ranch - Horse Lake</p> <p>Deer Zone X5A</p> <p>Lassen</p> <p>8,025 Acres</p>	<p>Authorized Harvest: 1 forked horn or better buck deer and 1 buck pronghorn antelope</p> <p>Issue 1 buck deer tag for the period of August 16, 2025, through November 30, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p> <p>Issue 1 buck pronghorn antelope tag for the period of August 9, 2025, through September 13, 2025.</p>	<p>Maintenance of rehabilitation project to Coon Camp Springs the spring and associated riparian vegetation on 20 acres by excluding cattle (allow grazing for 4-5 days only), a water storage tank, solar panel, and troughs.</p> <p>Complete clearance of 25 acres of juniper trees in an 80-acre area to enhance the riparian and wildlife habitat.</p> <p>Defer livestock grazing of the 300-acre Packard Field until after July 1 to improve duck and goose brood survival. Grazing will occur between July 1, 2025, and October 15, 2025.</p> <p>Maintain 5 goose nesting platforms at Packard Reservoir and Coon Camp Reservoir as needed.</p> <p>Knock seed off bitterbrush plants so cattle can stomp them into the ground for regeneration. Bitterbrush regeneration will</p>

***PLM AREA LICENSE  
5-YEAR RENEWALS, 2025-2029  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
Five Dot Ranch - Horse Lake Cont.		<p>be monitored annually through photo monitoring will be conducted to track growth and success of the practice.</p> <p>Cut at least 50 junipers annually outside of the Coon Camp Rehabilitation Project.</p>
<p>Five Dot Ranch – School Section</p> <p>Deer Zone X5A</p> <p>Lassen</p> <p>640 Acres</p>	<p>Authorized Harvest: 1 forked horn or better buck deer</p> <p>Issue 1 buck deer tag for the period of August 16, 2025, through November 30, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p>	<p>Maintain livestock exclusion fence around 2 aspen patches by inspecting it regularly and making any necessary repairs.</p> <p>Cut and disperse 50 mountain mahogany branches with ripe seeds in order to recruit young plants. Photo monitoring will be conducted to track growth and success of the practice.</p> <p>Cattle grazing will be utilized as 1 year of grazing and then 2 years of rest. There will only be 1 year of grazing in this 5-year plan (2027).</p>
<p>Five Dot Ranch - Tunnel Springs</p> <p>Deer Zone X5A</p> <p>Lassen</p> <p>2,600 Acres</p>	<p>Authorized Harvest: 1 forked horn or better buck deer and 2 buck pronghorn antelope</p> <p>Issue 1 buck deer tag for the period of August 16, 2025, through November 30, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p> <p>Issue 2 buck pronghorn antelope tags for the period of August 9, 2025, through September 13, 2025.</p>	<p>Repair damaged livestock-exclusion fencing with wildlife-friendly fencing at Tunnel Springs.</p> <p>Retain water in 2 reservoirs at 50% of the current year's water capacity for wildlife.</p> <p>Remove at least 5 acres annually of junipers for a total of 25 acres.</p> <p>Knock seeds off bitterbrush plants in the fall so cattle can stomp them into the ground for regeneration. Bitterbrush regeneration will be monitored annually photo monitoring will be conducted to track growth and success of the practice.</p> <p>Maintain the solar panel water pump system that keeps 12 water troughs full to provide water for wildlife.</p>

**PLM AREA LICENSE**  
**5-YEAR RENEWALS, 2025-2029**  
**PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS**

PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
Five Dot Ranch - Tunnel Springs Cont.		Coordinate with BLM to facilitate the gathering of wild horses on the property as soon as possible.
Five Dot Ranch - Willow Creek  Deer Zone X4  Lassen  7,200 Acres	<p>Authorized Harvest: 7 forked horn or better buck deer and 2 buck pronghorn antelope</p> <p>Issue 8 buck deer tags to take 7 buck deer for the period of September 13, 2025, through November 30, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p> <p>In no case shall the number of tags issued be used to exceed the authorized harvest.</p> <p>The number of tag holders actively hunting shall not exceed the number of deer available to harvest.</p> <p>Issue 2 buck pronghorn antelope tags for the period of August 9, 2025, through September 14, 2024.</p>	<p>Repair any damaged livestock-exclusion fencing around 4 aspen and willow stands totaling 30 acres that provide deer fawning habitat.</p> <p>Retain water in reservoirs and ponds at 50% of the current year's water capacity for wildlife by filling them as needed.</p> <p>Remove at least 200 conifers annually.</p> <p>No grazing will be allowed on North Pond for waterfowl habitat.</p> <p>Leave the third cutting of alfalfa on 100 acres for deer and pronghorn antelope use.</p> <p>Maintain a 50-acre field of alfalfa and grass, providing forage for deer.</p> <p>Maintain 4 goose nesting platforms at Round Valley Reservoir.</p> <p>Leave 100 acres of bitterbrush in the Windmill Field for wildlife.</p> <p>Leave 50 acres of native vegetation in the triangle field between SR 139 and Horse Lake Road for wildlife use.</p>
JS Ranch  Deer Zone C3  Shasta  7,134 Acres	<p>Authorized Harvest: 12 forked horn or better buck deer, 1 bull elk, and 3 bears</p> <p>Issue 12 buck deer tags for the period of August 1, 2025, through November 30, 2025.</p> <p>No more than 6 buck deer may be harvested after October 26, 2025.</p>	<p>Grazing management will be used to prevent erosion and leave browse and grass for wildlife use.</p> <p>Maintain 5 riparian protected areas of at least 100 acres to provide cover for wildlife and livestock are excluded.</p> <p>Maintain water in irrigation canals year-round to provide water for wildlife.</p>

***PLM AREA LICENSE  
5-YEAR RENEWALS, 2025-2029  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
JS Ranch Cont.	<p>Issue 1 bull elk tag for the period of August 1, 2025, through November 30, 2025.</p> <p>Issue 3 bear tags for the period of August 1, 2025, through December 31, 2025, or when the season closes because the Department has determined that 1,700 bears have been harvested. No cubs or females with cubs will be harvested. Cubs are defined as bears less than one year of age or bears weighing less than 50 pounds.</p>	<p>Continue to maintain at least 82 acres of irrigated pastures for wildlife use.</p> <p>Maintain at least a 50-acre irrigated pasture for elk foraging in the northeast corner of the ranch and the Rock Garden Flats.</p> <p>Mechanically control the spread of extensive blackberry thickets within a 650-acre area. Bramble margins and some interior areas will be cut or crushed to reduce blackberry water consumption and increase forage.</p> <p>Install water bars on dirt roads adjacent to Cow Creek to prevent sediment erosion flowing into the creek.</p> <p>Maintain cattle exclusion fencing and replant 50 acres within 5 wildlife food plots.</p> <p>Maintain the livestock exclusion area of 2,500 acres to provide forage for wildlife during late summer and early fall. Livestock are excluded from June 1, 2025 through October 31, 2025.</p> <p>Enhance and maintain ponds by enlarging and repairing spillways and dams and making any other necessary repairs.</p> <p>Maintain a 200-acre fenced area with no human disturbance or cattle grazing for wildlife use year-round. No commercial wood or rock harvesting on the entirety of the ranch.</p>

***PLM AREA LICENSE  
5-YEAR RENEWALS, 2025-2029  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
<p>Mendiboure Ranch</p> <p>Deer Zone X5B</p> <p>Lassen</p> <p>8,840 Acres</p>	<p>Authorized Harvest: 3 forked horn or better buck deer, and 1 buck pronghorn antelope</p> <p>Issue 6 buck deer tags to take 3 buck deer for the period of October 4, 2025, through November 16, 2025.</p> <p>No person may take more than 1 buck deer annually in the X zones.</p> <p>In no case shall the number of tags issued be used to exceed the authorized harvest.</p> <p>The number of tag holders actively hunting shall not exceed the number of deer available to harvest.</p> <p>Issue 1 buck pronghorn antelope tag for the period of August 23, 2025, through September 14, 2025.</p>	<p>Maintain aspen and willow livestock exclosure fencing at Etchecopar Spring, Van Loan Creek, and Big Springs by checking and repairing fencing if needed.</p> <p>Removal of at least 20 junipers annually. Create at least 3 brush piles from these removed trees.</p> <p>Burn at least 2 old decadent brush piles.</p> <p>Create a cattle exclosure that is at least 2 acres to protect willows on Van Loan Creek.</p> <p>Install a 1,000-gallon water tank at Smith Flat Dam, it will be used to maintain water in a wildlife trough from July through October.</p> <p>Install new well to keep water available for wildlife in field west of Mendiboure Rd.</p> <p>Build mounds for goose nesting on Mendiboure Reservoir.</p> <p>Maintain all previously developed springs and water sources.</p> <p>Maintain perimeter fences any repairs will be made to be wildlife friendly.</p> <p>Continue rotational cattle grazing so that the residual dry matter does not fall below 40% using the Double-Weight sampling technique.</p>

**PLM AREA LICENSE  
5-YEAR RENEWALS, 2025-2029  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS**

<b>NORTHERN REGION</b>		
<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Llano Seco Ranch</p> <p>Deer Zone D4</p> <p>Butte</p> <p>14,500 Acres</p>	<p>Authorized Harvest: 25 forked horn or better buck deer, and 5 antlerless deer</p> <p>Issue 25 buck deer tags for the period of September 1, 2025 through November 30, 2025.</p> <p>Issue 5 antlerless deer tags for the period of September 1, 2025 through November 30, 2025.</p>	<p>Treat/mow 250 acres of star and bull thistle on the west side of the ranch.</p> <p>Grow 500 acres of dry land grains and alfalfa that will benefit wildlife.</p> <p>Maintain or replace existing 50 owl and wood duck boxes.</p> <p>Maintain or replace 6 pond turtle basking structures.</p>
<p>Rock Creek</p> <p>Deer Zone C4</p> <p>Butte/Tehama</p> <p>9,945 Acres</p>	<p>Authorized Harvest: 30 forked horn or better buck deer</p> <p>Issue 33 buck deer tags to take for the period of August 30, 2025 through November 30, 2025.</p>	<p>Maintain 2 spring sites and 2 well sites which includes repair or replacement of pumps, troughs, and fencing.</p> <p>Maintain restrictions on grazing to under 250 AUMs on the Garner Ranch</p> <p>Close 1,849 out of 5,545 acres of the Rose Ranch to grazing to aid in post fire recovery.</p> <p>Close the Watson to grazing to aid in post fire recovery.</p> <p>Block cattle from accessing Pine Creek and Rock Creek on the Rose Ranch.</p> <p>Start repairs on previously restored springs to repair fire damaged structure and fences, plus to rebuild the burned brush piles starting on the Negro and Warren Springs on the Rose Ranch. The spring fences, water troughs and other structure damage will be restored as needed. Subject to available remaining trees and brush, the new brush piles will be built with a minimum size of 6 feet high X 6 feet wide X 10 feet long.</p>



***PLM AREA LICENSE  
5-YEAR RENEWALS, 2025-2029  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>CENTRAL REGION</b>		
<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Rooster Comb Ranch</p> <p>Deer Zone A</p> <p>Stanislaus County</p> <p>4,862 Acres</p>	<p>Authorized Harvest: 3 antlerless deer</p> <p>Issue 3 antlerless deer tags for the period of August 9, 2025 through November 30, 2025.</p>	<p>Maintain elk crossings.</p> <p>Maintain water sources.</p> <p>Install 1 guzzler, tank and trough.</p> <p>Plant 20-40 acres of wildlife forage.</p> <p>Continue to clear decadent red chaparral brush to allow new growth.</p> <p>Conduct population surveys of big game species in collaboration with the California Department of Fish and Wildlife (CDFW) for both ground and aerial surveys.</p> <p>Support game wardens and CDFW staff access for wildlife research and management efforts (game counts, biological surveys, capture/collar efforts, etc.).</p> <p>Contribute to CDFW disease surveillance in deer and elk by providing samples to improve statewide disease surveillance.</p>

***PLM AREA LICENSE  
5-YEAR RENEWALS, 2025-2029  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
<p>San Bartolome Ranch</p> <p>Deer Zone A</p> <p>Monterey</p> <p>3,045 Acres</p>	<p>Authorized Harvest: 1 bull elk and 2 antlerless elk</p> <p>Issue 1 bull elk tag for the period of July 2, 2025, through December 31, 2025.</p> <p>Issue 2 antlerless elk tags for the period of September 15, 2025, to December 31, 2025.</p> <p>Issue three (3) forked horned bucks or better, and three (3) either-sex deer tags for the period of July 2 to November 30 annually.</p>	<p>Install elk crossings.</p> <p>Implement annual invasive weed control measures to reduce competition with native vegetation.</p> <p>Convert 1 existing water source to be wildlife-friendly.</p> <p>Plant 50 acres exclusively for wildlife forage.</p> <p>Continue implementing rotational grazing practices across all pastures.</p> <p>Construct one 10 foot x 10 foot brush pile.</p> <p>Provide opportunities for youth hunters.</p> <p>Provide 2 new structures each year—bat roosts, owl boxes, or raptor perches—to enhance habitat for wildlife species.</p> <p>Rehabilitate existing quail guzzlers and construct new ones to improve water availability and habitat quality bird species.</p> <p>Conduct population surveys of big game species in collaboration with the California Department of Fish and Wildlife (CDFW) for both ground and aerial surveys.</p> <p>Support game wardens and CDFW staff access for wildlife research and management efforts (game counts, biological surveys, capture/collar efforts, etc.).</p> <p>Contribute to CDFW disease surveillance in deer and elk by providing samples to improve statewide disease surveillance.</p>

**From:** J. M.  
**Sent:** Thursday, March 13, 2025 07:30 PM  
**To:** FGC <[FGC@fgc.ca.gov](mailto:FGC@fgc.ca.gov)>  
**Subject:** PLM Application Alexandre Dairy Ft. Dick/Crescent City

Dear Commission,

Please see the email below.

I would appreciate the opportunity to speak with you regarding my thoughts as to why the Alexandre Dairy should not hold a PLM for the Elk Herd in Ft. Dick.

They are not stewards of the program.

Sincerely,

J. M.

----- Forwarded Message -----

**From:** J. M.  
**To:** Kiana Nova; Shawn Fresz; Jeffrey Stoddard  
**Cc:** Victoria Barr  
**Sent:** Thursday, March 13, 2025 at 07:25:13 PM PDT  
**Subject:** Share Elk Hunt Experience Ft. Dick/ Alexandre Dairy

Good Afternoon,

Our family would like to share what we experienced during a Share Elk Hunt on November 22-25, 2024.

We have been fortunate enough to have previously drawn this hunt (twice) and harvested bulls [REDACTED] in 2020 and 2021. Therefore we feel that we are familiar with the area and the purpose of the Share Program.

We specifically have concern with the actions of representatives of Alexandre Dairy and their employees.

We attended the hunter orientation at the Grange Hall, met with [REDACTED] and visited the properties that were included in our hunt for the weekend, at this time there were NO signs indicating that there were any PLM enrolled properties in the entire Ft. Dick area that we toured.

On the afternoon of Friday, [REDACTED] 2024 we were driving the Ft. Dick area in order to locate the herds. We found a large group west of Lower Lake Rd as we turned the corner at Mosley Road. The herd was headed east and was preparing to cross Lower Lake (leaving Alexandre property and entering Tryon property). A flatbed farm truck hauling milk cans slowed and drove past us. Within 10 minutes there were 4 vehicles parked north of us on Lower Lake Road and positioned directly in front of the path of travel that the herd was wanting to go. We thought it was strange that in the tiny town of Ft. Dick there would be so many "elk watchers". We waited until dark and our daughters took photos of the herd and lamented of how many of the elk were limping. The same vehicles waited in the road the entire time. As we were leaving a younger brunette woman pulled up to us and asked "are you on a Share hunt? You must be the unlimited bull hunter" At first we thought nothing of the exchange, but did think her comment was odd.

From that point forward, our vehicle was followed by various, flat bed single cab pickups, smaller work trucks and a Toyota 4-runner. All of the work trucks had cow manure packed in the wheel wells or milk cans in the back.

It should be noted, this particular weekend there was an unprecedented rain storm. Any time that we located the herd moving towards the Tryon property someone would show up on a 4 wheeler and start driving through the fields in order to keep the herd on Alexandre Property. This person was not performing any activities that would

pertain to maintaining a pasture, there were no other livestock present in the fields that they would be checking on and obviously they were not irrigating. At this point it was very apparent that they were intentionally herding and maintaining the entire group of elk west of Lower Lake Road. The field that they were maintaining the herd in had standing water due to the rains and it was evident that the elk were wanting to move to higher ground but were being impeded. I am able to make this observation due to the fact that we drove "the loop" watching the herd approximately every 90 minutes for the duration of our hunt.

The most disturbing event occurred on Sunday, [REDACTED] 2024 between 0807 and 0854. We located a herd (not the one that was on Lower Lake Rd) off of South Fred D. Haight Dr. We observed the elk traveling in a westerly direction towards the Ulrich property. I confirmed property boundaries with my On-X app and contacted [REDACTED] [REDACTED] know the herd was moving towards Ulrich. At this point we saw a flurry of activity at the two homes along Fred D. Haight Dr. ie farm trucks leaving the houses. [REDACTED] phoned the property owner and we met with him at his silage pit in order to set up. We also met with the other hunter that had a tag. (NOTE: this hunter's partner was a California Fish and Wildlife Officer from Shasta he stated he lived in Millville, please contact [REDACTED] [REDACTED] will have his name as an observer this weekend.) As our group was congregating at the silage bags at the Ulrich Unit we heard a gunshot. We all looked at other in disbelief and then started to look for the origin of the gunshot. Through my binoculars I observed a man in the back yard of the home on the Alexandre Property. He had a hand gun and fired it two more times toward the north western direction and the area of the herd of elk. At this point the elk spooked at ran north into the thicket of trees and back onto Alexandre property. I continued to watch this person through my binoculars as he remained in the back yard until the herd left. I confirmed distances with On X the herd was 52 yards from the property line when the shots were fired. We were 650 yards from the shooter. I phoned both of the local wardens [REDACTED] no one answered. I left V.M. messages for all three stating that we were experiencing shots fired and we were not feeling safe. We did not hear back from anyone. [REDACTED] also indicated that [REDACTED] was going to phone Fish and Wildlife contacts and the local authorities. There should be record of these phone calls to dispatch. At this point we felt very targeted and decided that our efforts to fill a tag would be futile. We packed it up and went home.

Upon further research I discovered that Alexandre Dairy held PLM tags, they also listed their hunts for sale at a premium on multiple social media sides and blogs. A historical search of their social media reveals that they claim to "manage" a herd of elk on their farm. Chris Howard their environmental and grant manager is also their County Supervisor which should be a direct conflict of interest. Alexandre's have entered into a sales contract with a well know celebrity to open a hunting lodge just north of their PLM properties. I have also viewed several violations with the Fish and Wildlife by the Alexandre's. These previous citings are indicative of their blatant disregard for the environment they are impacting.

Our group had seven people that witnessed the actions of Alexandre Dairy. We are all willing to attest that these statements are true. The Alexandre family is shamelessly abusing the PLM program and are coveting the herd, they do not have the best interest of the elk in mind. They are 100% financially driven at the detriment of the well being of the wildlife and the financial well being of the community.

I implore the California Department of Fish and Wildlife to consider the current (and documented) past actions of the Alexandre Family. Do not renew their PLM agreement.

These amazing elk belong to the people of the State of California; we have entrusted you to do the right thing.

Please contact us for any further information regarding our experience.

Sincerely,

The J. M. Family

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**From:** Michael Stapleton  
**Sent:** Tuesday, November 3, 2020 06:56 AM  
**To:** FGC  
**Subject:** Fwd: Fort Dick Group SHARE Elk Hunt Oct. 10-13, 2020

Dear Melissa,

I am of the understanding that last year, Alexandre Dairy of Del Norte County was recommended by the Private Lands Management (PLM) Coordinator, Victoria Barr, to not be renewed in the PLM Program because of previous infractions. However, she was overruled and the Alexandre Dairy of Del Norte County was renewed into the PLM Program. I would ask that the information provided below be shared with the Fish and Game Commissioners and that consideration be given to removing Alexandre Dairy from the program. They have clearly abused the requirements of the PLM Program. Please feel free to contact me.

Thank you,  
Michael Stapleton

[REDACTED]  
[REDACTED]  
[REDACTED]

----- Forwarded message -----

**From:** Michael Stapleton [REDACTED]  
**Date:** Mon, Oct 12, 2020 at 11:49 AM  
**Subject:** Fort Dick Group SHARE Elk Hunt Oct. 10-13, 2020  
**To:** Victoria Barr, Carrington Hilson, Christine Found-Jackson, Jeffrey Stoddard, Chuck Bonham, Tina Bartlett  
**Cc:** Billy Tedsen, Justin Marquis, Jeffrey Leikauf, LCPJCS

Victoria and other DFW employees,

I was a support person for Wendy Marquis that got drawn for the Fort Dick Group SHARE Elk Hunt Oct. 10-13, 2020. On at least four

incidents, Alexandre Dairy personnel were witnessed, video taped, or suspected of interfering in the legal SHARE hunts of the four hunters involved by impeding the natural movements of the elk from leaving the Alexandre Dairy properties and entering SHARE properties. I have attached a drawing to show the locations.

- "A" - at approximately 9-10 am on Saturday Oct. 10, 2020 Hunter Jeff Leikauf (cell [REDACTED]) witnessed an Alexandre Dairy employee in a white Toyota truck interfering with the movement of elk onto the Tedsen property to the south.
- "B" - mid pm Saturday Oct. 10, 2020 Hunter Wendy Marquis (cell [REDACTED]) was stalking a herd of elk and witnessed an Alexandre Employee in a white Dodge flatbed truck driving nearby and screaming which dispersed the elk.
- "C" - at 6:46 pm on Saturday Oct. 10, 2020 Michael Stapleton (cell [REDACTED]) witnessed a herd of elk right next to the southerly fence line of the Weatherall SHARE hunt property. Suddenly an Alexandre Dairy property employee in a white Dodge flatbed truck started herding the elk away from the fence line that they appeared to be wanting to cross, on back onto the Alexandre Dairy property for 1/4-1/3 mile at a relatively high speed chasing the elk. The elk appeared to be very distressed by this herding by the truck. At times the truck had its horn blaring as it chased the very disturbed and confused elk herd. It was almost unbelievable what I was witnessing and videoed.  
<https://photos.app.goo.gl/TmRWogzSxiA5Gv1v8>
- "D" - at approximately 7 am Sunday Oct. 11, 2020 Billy Tedsen (cell [REDACTED]), Fort Dick Group SHARE Hunt Coordinator, witnessed a white Toyota Alexandre Dairy truck that had just left a field to chase elk back from a fence line that they could

potentially cross onto SHARE hunt property. There were fresh tire tracks in the dewy field and the truck's tires were covered in wet dew.

The fact that none of the elk herds on the Alexandre Dairy Private Lands Management (PLM) lands were allowed to leave by the Alexandre Dairy employees, the SHARE hunters were unable to harvest an elk. Alexandre Dairy interfered with their legal hunts. Alexandre Dairy does not own these elk but it appears that they think so. This same thing happened two years ago on my stepson's , Brett Roslosnik, DN South Elk hunt where a white Alexandre Dairy truck stopped a herd of elk from entering a SHARE property where he could legally hunt. Despite hunting for 7 days, Brett was unable to fill his elk tag. A complaint regarding this interference in the hunt by Alexandre Dairy in keeping the elk on their PLM lands was sent into Victoria and the local game warden, Officer Walker, right after this hunt two years ago. Shortly after that I received a phone call from Blake Alexandre, owner of the dairy, telling me that "his Alexandre Dairy employees would never do that". Well they did at that time and they are still doing it.



The SHARE elk hunters spend up to \$400 each applying for these elk tags, pay approximately \$450 for the elk tag, take time off from work, have fuel, lodging, food expenses, and daycare for their children for these hunts and often travel from Southern CA . It is no small expense for these elk hunters to hunt these SHARE elk.

Alexandre Dairy appears to want to keep all of these elk on their property so that they can make enormous amounts of money from selling the elk tags. It seems like Alexandre Dairy is grossly abusing the Private Lands Management Program and should be removed from the program. I would encourage you to talk to all of the hunters from this hunt to verify this information. Their names and numbers are:

- Wendy Marquis [REDACTED]
- Jeff Leikauf [REDACTED]
- Keith Theige [REDACTED]
- Riley Breslin [REDACTED]

<https://photos.app.goo.gl/TmRWogzSxjA5Gv1v8>

Thank you,  
Michael Stapleton

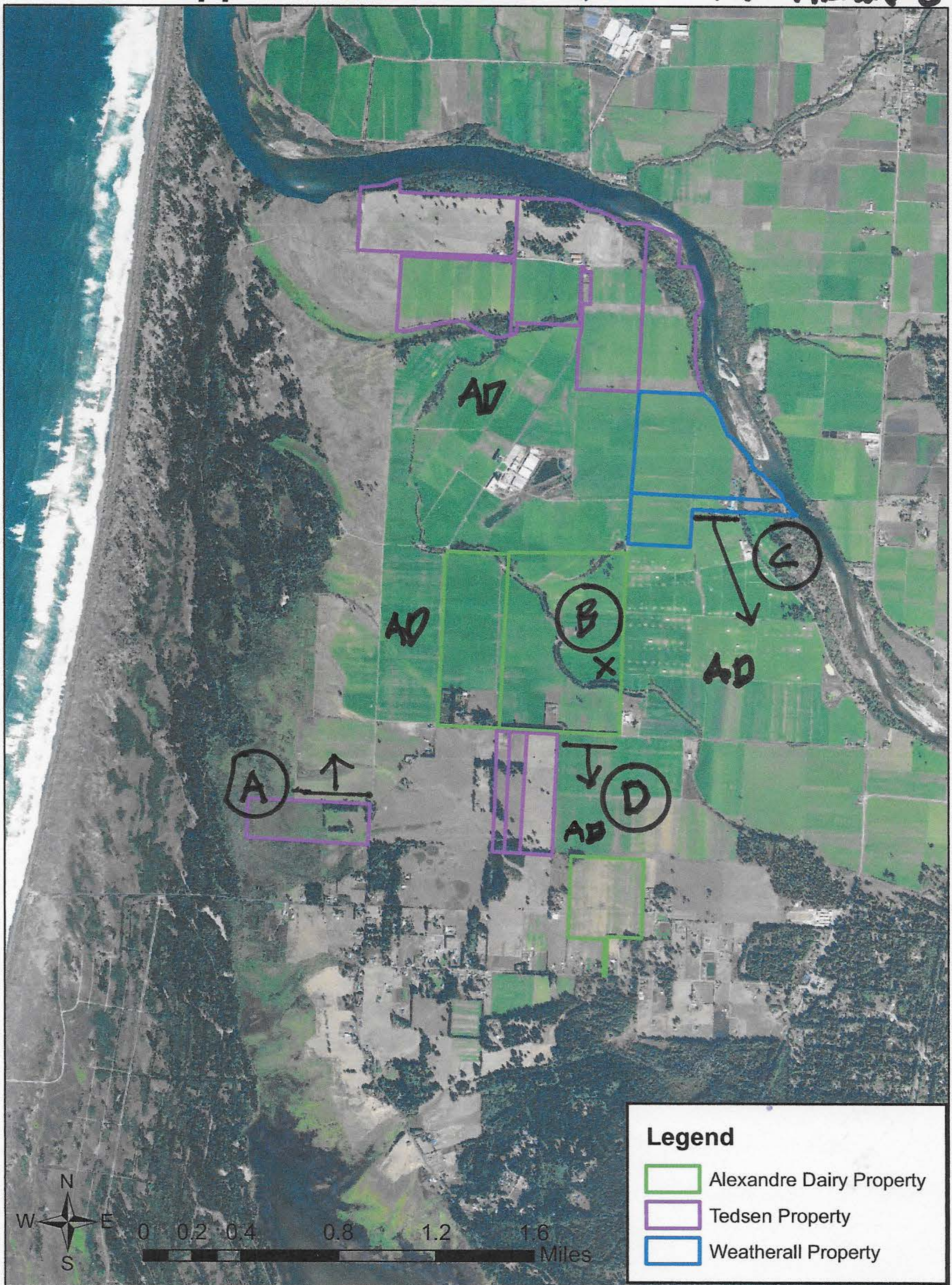
[REDACTED]



# Elk SHARE Program - Fort Dick

Approximate Acres - 1,207

AD - Alexandre Dairy



A, C, D ———— Elk prevented from entering share property  
\* B X - Interference with elk hunters



Signed original on file,  
Received May 16, 2025

## Memorandum

Date: May 1, 2025

To: Melissa Miller- Henson  
Executive Director  
Fish and Game Commission

From: Charlton H. Bonham  
Director

Subject: **Agenda Item for the June 11-12, 2025 Fish and Game Commission Meeting  
Private Lands Wildlife Habitat Enhancement and Management (PLM) Area  
Licenses**

California Fish and Game Code Section 3406(c) requires that the activities conducted pursuant to each Private Lands Wildlife Habitat Enhancement and Management Plan (PLM) shall be reviewed annually by the Department of Fish and Wildlife (Department) and by the Fish and Game Commission (Commission) at a public hearing. Licenses for such areas may be granted by the Commission for a period of five (5) years following department review and approval of the management plan (Title 14, California Code of Regulations Section 601(a)).

The Department has reviewed the Initial management plans for 10 new properties in 9 counties consisting of approximately 26,725 acres and the 5-year renewals for 12 properties in 7 counties consisting of approximately 72,255 acres. Additionally, the Department has reviewed the annual reports for 43 properties in 13 counties consisting of approximately 285,736 acres.

The Department recommends that the Commission approve the wildlife management plans, applications, and each 2025/26 harvest program under conditions specified in the attached tables. Habitat improvements accomplished under these plans will enhance and maintain wildlife resources on and around the PLM areas. The goals and objectives stated in the management plans are compatible with Department management plans for appropriate species in these areas.

The attached tables represent the second, and final, list of PLM properties recommended for approval by the Commission in 2025. We previously recommended a first list of PLM properties for approval at the April 16, 2025, Commission meeting.

If you have any questions, please contact Ms. Victoria Barr at [REDACTED] or by email at [REDACTED]

Melissa Miller-Henson, Executive Director  
Fish and Game Commission  
May 1, 2025  
Page 2

Attachment

ec: Chad Dibble, Deputy Director  
Wildlife and Fisheries Division

[REDACTED]

Scott Gardner, Branch Chief  
Wildlife Branch

[REDACTED]

Mario Klip, Environmental Program Manager  
Wildlife Branch

[REDACTED]

Victoria Barr, Environmental Scientist  
Wildlife Branch

[REDACTED]

***PLM AREA LICENSE  
ANNUAL RENEWALS, 2025-2026  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>NORTHERN REGION</b>		
<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Ash Valley Ranch Deer Zone X3A</p> <p>Lassen 8,736 Acres</p>	<p>Authorized Harvest: 4 forked horn or better buck deer and 1 buck pronghorn antelope</p> <p>Issue 6 buck deer tags to take 4 buck deer for the period August 16, 2025, through November 30, 2025.</p> <p>No person shall take more than one buck deer annually in the X zones.</p> <p>In no case shall the number of tags issued be used to exceed the authorized harvest.</p> <p>The number of tag holders actively hunting shall not exceed the number of deer available to harvest.</p> <p>Issue 1 buck pronghorn antelope tag for the period of August 2, 2025, through September 30, 2025.</p>	<p>Remove noxious weeds from at least 20 acres by grubbing and/or chemical application.</p> <p>Through the use of rotational grazing prescriptions, maintain previously completed habitat restoration work.</p> <p>Maintenance on at least 40 acres of previously treated juniper removal projects.</p>
<p>Basin View Ranch Deer Zone X2</p> <p>Modoc 8,500 Acres</p>	<p>Authorized Harvest: 7 forked horn or better buck deer and 1 buck pronghorn antelope</p> <p>Issue 7 buck deer tags for the period of October 1, 2025, through November 30, 2025.</p> <p>No person shall take more than one buck deer annually in the X zones.</p> <p>Issue 1 buck pronghorn antelope tag for the period of August 1, 2025, through August 30, 2025.</p>	<p>Maintain and retreat at least 100 acres of previous juniper clearing projects to encourage shrub and forb recruitment by cutting juniper saplings.</p> <p>Leave at least 35% of crop lands left fallow on a three-year rotation.</p> <p>Install flushing bar on mowing machines to decrease animals being struck during harvesting.</p> <p>Inspect and, as necessary repair at least 10 miles of exclusionary fencing that controls livestock movement and grazing around ponds and springs.</p>

**PLM AREA LICENSE**  
**ANNUAL RENEWALS, 2025-2026**  
**PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS**

PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
Basin View Ranch Cont.		Exclude livestock grazing from 1 of the rotation management units (775 acres) year-round.
Black Ranch Shasta Deer Zone C3 1,000 Acres	<p>Authorized Harvest: 2 forked horn or better buck deer, 2 antlerless deer, 1 bull elk, and 1 antlerless elk</p> <p>Issue 2 buck deer tags and 2 antlerless deer tags for the period of September 1, 2025, through November 30, 2025.</p> <p>Issue 1 bull elk tag and 1 antlerless elk tag for the period of September 1, 2025, through November 30, 2025.</p> <p>No antlerless deer or elk may be harvested before September 15, 2025.</p>	<p>Maintain the 145-acre wetlands project that was constructed last year to re-establish the native hydrology of the floodplain to Burney Creek.</p> <p>Establish a forest health and fire reduction project on at least 335 acres.</p> <p>Maintain 4 owl boxes and 6 goose nesting platforms by checking use and replacing nesting material as necessary.</p> <p>Maintain 12 bat boxes.</p> <p>Rebuild 10 wood duck boxes and maintain 18 wood duck boxes along the creek.</p> <p>Build 10 elevated goose nests.</p> <p>Construct at least 2 brush piles measuring 6 feet high and 15 feet in diameter.</p> <p>Conduct rotational regenerative grazing on the property.</p> <p>Install at least 5 wildlife crossings of boundary fencing on the east side of the property.</p> <p>Establish a conservation easement on the majority of the farmland property.</p>

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ANNUAL RENEWALS, 2025-2026  
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<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Clarks Valley Ranch</p> <p>Deer Zone X3B</p> <p>Lassen</p> <p>2,793 Acres</p>	<p>Authorized Harvest: 3 forked horn or better buck deer</p> <p>Issue 3 buck deer tags for the period of August 1, 2025, through November 30, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p>	<p>Remove at least 0.25 miles of field fencing to reduce wildlife entanglements.</p> <p>Install at least 0.25 miles of wildlife friendly fencing.</p> <p>Install at least 500 feet of temporary fencing at Clarks Creek to protect the riparian restoration project.</p> <p>Install at least 3 beaver dam analog in Clarks Creek to assist in better hydrologic function and riparian habitat restoration.</p>
<p>Cow Creek Ranch</p> <p>Deer Zone C3</p> <p>Shasta</p> <p>4,714 Acres</p>	<p>Authorized Harvest: 10 forked horn or better buck deer and 5 bear</p> <p>Issue 10 buck deer tags for the period of August 1, 2025, through November 30, 2025.</p> <p>No more than 6 buck deer may be taken after October 26, 2025.</p> <p>Issue 5 bear tags for the period of August 1, 2025, through December 31, 2025, or when the season closes because the Department has determined that 1,700 bears have been harvested. No cubs or females with cubs will be harvested. Cubs are defined as bears less than one year of age or bears weighing less than 50 pounds.</p>	<p>Treat at least 20 acres of decadent brush annually with a bulldozer by clearing and piling brush.</p> <p>Create at least 5 brush piles that are at least 5 feet tall and 20 feet wide.</p> <p>Retain oaks, standing snags and large woody debris that is not a safety hazard.</p> <p>Establish and maintain at least 1 spring on the property.</p>

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ANNUAL RENEWALS, 2025-2026  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Dixie Valley Ranch</p> <p>Deer Zone X3A</p> <p>Lassen</p> <p>12,500 Acres</p>	<p>Authorized Harvest: 4 forked horn or better buck deer, 2 buck pronghorn antelope, and 1 bull elk</p> <p>Issue 4 buck deer tags to take forked horn or better buck deer for the period of August 1, 2025, through November 30, 2025.</p> <p>No more than 3 buck deer may be harvested after October 19, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p> <p>Issue 2 buck pronghorn antelope tag for the period of August 1, 2025, through September 30, 2025.</p>	<p>Manage timed cattle grazing on 250 acres of natural pasture containing a large pond, a creek, and several springs in the southeast corner of the ranch during May and September/ October to provide forage and water for wildlife.</p> <p>Continue revitalization of at least 90 feet of aspen grove.</p> <p>Juniper removal project tree removal has been completed and the remaining slash piles will be burned.</p> <p>Leave the final cutting of hay standing in the 800-acre irrigated pasture to provide forage for wildlife.</p> <p>Any old fencing will be replaced with wildlife friendly fencing.</p> <p>Maintain 25 Canada goose nesting platforms at Saw Mill pond, Jacks Hole and in the large marsh area.</p> <p>Maintain at least 21 ponds and 25 miles of canals and waterways.</p>
<p>Duncan Creek Ranch</p> <p>Deer Zone B5</p> <p>Shasta</p> <p>1,366 Acres</p>	<p>Authorized Harvest: 6 forked horn or better buck deer</p> <p>Issue 8 buck deer tags for the period September 1, 2025, through November 30, 2025.</p> <p>In no case shall the number of tags issued be used to exceed the authorized harvest.</p> <p>The number of tag holders actively hunting shall not exceed the number of deer available to harvest.</p>	<p>Burn at least 10 acres annually of decadent chamise to improve forage quality and travel corridors.</p> <p>Maintain at least 3 miles of established travel corridors throughout the property.</p> <p>Overseed areas that have been burned annually.</p>

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ANNUAL RENEWALS, 2025-2026  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>El Rancho Rio Frio</p> <p>Deer Zone B5</p> <p>Tehama</p> <p>12,682 Acres</p>	<p>Authorized Harvest: 24 forked horn or better buck deer</p> <p>Issue 24 buck deer tags for the period of August 15, 2025, through November 30, 2025.</p> <p>No more than 12 deer may be harvested after October 26, 2025.</p>	<p>Maintain and inspect current guzzlers for damage and repair as necessary.</p> <p>Maintain all roads to ensure erosion control measures are in place to lessen the impacts to any waterways.</p> <p>Check the creek and riparian areas for erosion issues and establish preventative measures.</p> <p>Create at least 3 small wildlife brush piles measuring at least 15 feet in diameter and 6 feet tall.</p> <p>Plant at least 2 acres of previously disturbed areas with perennial grasses and clovers.</p> <p>Maintain at least 10 wood duck boxes along Cold Fork Creek.</p> <p>Control invasive weed species through physical removal, spraying with herbicide, or mowing/ weed eating.</p>
<p>Five Dot Ranch - Avila</p> <p>Deer Zone X3A</p> <p>Lassen</p> <p>11,000 Acres</p>	<p>Authorized Harvest: 6 forked horn or better buck deer</p> <p>Issue 12 buck deer tags to take 6 buck deer for the period of September 30, 2025 through November 30, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p> <p>In no case shall the number of tags issued be used to exceed the authorized harvest.</p>	<p>Continue reduced livestock use at 300 head (previously 450 head).</p> <p>Cut at least 300 juniper trees.</p> <p>Continue to exclude livestock from 7 aspen and wetland habitat enclosures by inspecting fencing and making any necessary repairs. These areas provide important deer fawning habitat.</p> <p>Maintain 6 nesting platforms for Canada geese at 4 reservoirs by checking use and replacing nesting material as necessary.</p> <p>Cut and disperse 100 mountain mahogany branches with ripe seeds in order to recruit young plants.</p>



***PLM AREA LICENSE  
ANNUAL RENEWALS, 2025-2026  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
Five Dot Ranch – Avila Cont.	The number of tag holders actively hunting shall not exceed the number of deer available to harvest.	Maintain 6 existing springs by checking for broken pipes and repairing as necessary.  Maintain 4 existing reservoirs by inspecting spillways and dams for damage and making any necessary repairs.
Fort Bidwell Ranch  Deer Zone X-3B  Modoc  9,460 Acres	Authorized Harvest: 3 forked horn or better buck deer  Issue 3 buck deer tags for the period of August 1, 2025, through November 30, 2025.	Mechanically treat at least 20 acres of junipers. Removal will promote native beneficial forages, these junipers will be cut and piled left for nesting, then burned later.  Aspen stand restoration on 1 aspen stand through removal of junipers, encroaching conifers and downed woody debris.  Maintain the wildlife fenced aspen stand to exclude cattle.  Type shift at least 50 acres of agricultural fields to meadow grasses that promote bedding and areas of foraging for a variety of wildlife and utilize standing buffers of grasses along roads.
Grasshopper Valley Ranch  Deer Zone X5A  Lassen  12,063 Acres	Authorized Harvest: 3 buck deer forked horn or better and 1 buck pronghorn antelope  Issue 3 buck deer tags for the period of August 1, 2025, through November 30, 2025.  No person shall take more than 1 buck deer annually in the X zones.  Issue 1 buck pronghorn antelope tag for the period of August 1, 2025, through September 30, 2025.	Exclude cattle from the northern 1/3 of the Grasshopper Valley during Greater sage-grouse breeding season from December 1 through June 15 annually.  At least 18 miles of old fencing replaced with wildlife friendly fencing has been completed.  Install 7 float regulated water troughs with wildlife escape ramps.  Ditch repairs and laser level fields to better utilize irrigation water and create more forage availability.

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ANNUAL RENEWALS, 2025-2026  
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PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
Grasshopper Valley Ranch Cont.		Juniper removals as needed and outlined from CDFW staff.
<p>Hathaway Oak Run Ranch</p> <p>Deer Zone C3</p> <p>Shasta</p> <p>6,640 Acres</p>	<p>Authorized Harvest: 12 forked horn or better buck deer</p> <p>Issue 12 buck deer tags for the period of September 20, 2025, through November 30, 2025.</p> <p>No more than 9 buck deer may be harvested after October 26, 2025.</p>	<p>Develop the 2 spring sites to provide year-round water sources for wildlife, one in the SE corner of section 3 and one in the Swede Creek basin of section 4.</p> <p>Maintain the 6-acre riparian livestock exclusion on Swede Creek by inspecting fencing and making any necessary repairs.</p> <p>Maintain existing spring developments that provide year-round water for wildlife by checking for broken pipes and repairing as necessary and clearing sediment and vegetation from the sources.</p> <p>Maintain 10 wood duck boxes.</p> <p>Maintain existing deer forage areas by diverting spring water over the maximum area possible and along the contour through a shallow ditch system.</p> <p>Promote vernal pool flora and fauna by using cattle grazing to protect and maintain 2 vernal pools in Section 9 and 18.</p> <p>Maintain or create 4 brush piles at least 6 feet high and 10 feet wide.</p> <p>Maintain previously installed owl boxes along Oak Run Creek by checking use and replacing material as necessary.</p> <p>Maintain all previously installed bat boxes.</p>

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<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Jerusalem Creek Ranch</p> <p>Deer Zone B5</p> <p>Shasta</p> <p>726 Acres</p>	<p>Authorized Harvest: 4 forked horn or better buck deer</p> <p>Issue 4 buck tag for the period of August 16, 2025, through November 30, 2025.</p>	<p>Maintain previous water sources that provide water for wildlife by checking for broken pipes and repairing as necessary. Mechanically treat a minimum of 10 acres decadent Ceanothus or white leaf manzanita.</p> <p>Enhance and maintain 2 spring sources by removing invasive plants and maintaining exclusionary fencing.</p> <p>Create wildlife migratory travel routes through clearing ridges, trails, and road systems on 5 acres over the next 5 years.</p>
<p>Kampmann Ranch</p> <p>Deer Zone C3</p> <p>Shasta</p> <p>557 Acres</p>	<p>Authorized Harvest: 3 forked horn or better buck deer</p> <p>Issue 3 buck deer tags for the period of August 1, 2025, through November 30, 2025.</p>	<p>Maintain a livestock exclusion area encompassing at least 200 acres.</p> <p>Rotationally graze no more than 40 pair of cattle from April 1 through June 15.</p> <p>Remove 1000 feet of woven wire fencing and replace with wildlife friendly fencing.</p> <p>Create a riparian protection area in Unit 4.</p> <p>Treatment of Himalayan blackberry thickets in middle spring.</p> <p>Rangeland seeding in at least 1 acre.</p> <p>Maintain the previously installed erosion control structures.</p> <p>Mechanically treat at least 0.50 acre of decadent brush to create more palatable feed for wildlife.</p> <p>Install at least 1 wood duck nesting box.</p>

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<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Kramer Ranch PLM</p> <p>Deer Zone X1</p> <p>Lassen</p> <p>4,070 Acres</p>	<p>Authorized Harvest: 5 forked horn or better buck deer, and 1 buck pronghorn antelope</p> <p>Issue 5 buck deer tags for the period of August 1, 2025, through November 30, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p> <p>Issue 1 buck pronghorn antelope tag for the period of August 1, 2025, through September 15, 2025.</p>	<p>Remove conifers and junipers from at least 5 acres.</p> <p>Restore a 0.50 acre spring site through removing conifers and junipers.</p> <p>Maintain all existing wildlife friendly fences.</p> <p>Remove conifer and junipers from springs.</p> <p>Maintain aspen exclusion fencing from previous projects.</p>
<p>Little Dry Creek Ranch</p> <p>Deer Zone C4</p> <p>Tehama</p> <p>2,000 Acres</p>	<p>Authorized Harvest: 2 forked horn or better buck deer</p> <p>Issue 2 buck deer tags for the period of October 20, 2025, through November 30, 2025.</p>	<p>Continue to exclude livestock grazing from the entire ranch to benefit wildlife.</p> <p>Maintain 3 springs and associated planted perennial grass areas by checking for broken pipes and repairing as necessary.</p> <p>Treat at least 2 acres of yellow star thistle with herbicides.</p> <p>Keep trespass livestock off the ranch by annually inspecting the perimeter fence and repairing any damage.</p>
<p>Long Prairie Farms</p> <p>Deer Zone X1</p> <p>Siskiyou</p> <p>1,814 Acres</p>	<p>Authorized Harvest: 2 either-sex deer and 1 bull elk</p> <p>Issue 2 either-sex deer tags for the period of September 1, 2025, through November 30, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p>	<p>Remove western juniper from at least 5 acres to improve shrub recruitment.</p> <p>Increase forage quality for wildlife by pruning bitterbrush and mechanically disturbing the soil within a 5-acre area.</p> <p>Maintain 9 miles of exclusion fencing on the ranch to prohibit grazing from trespass cattle.</p>

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ANNUAL RENEWALS, 2025-2026  
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<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
Long Prairie Farms Cont.	<p>No antlerless harvest may occur before September 15, 2025.</p> <p>Only 1 buck deer shall be harvested after October 19, 2025.</p> <p>Issue 1 bull elk tag for the period of September 1, 2025, through December 30, 2025.</p>	<p>Use ground water pumps to create and maintain a 1-acre wetland to provide year- round water for wildlife.</p> <p>Retain at least 200 acres of alfalfa and timothy grass in the crop pivot corners to provide fall forage for wildlife.</p> <p>Identify and retain at least 3 pine and/or juniper trees currently providing nesting opportunities for raptors on the ranch.</p> <p>Attempt to remove feral horses and fence from the property.</p>
<p>Lookout Ranch</p> <p>Deer Zone X1</p> <p>Modoc</p> <p>6,880 Acres</p>	<p>Authorized Harvest: 6 forked horn or better buck deer</p> <p>Issue 6 buck deer tags for the period of August 15, 2025, through November 30, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p>	<p>Remove western junipers from 3 acres at Moon Pasture.</p> <p>Maintain previous water development projects.</p> <p>Rotate 200 head of cattle through all of deeded ground. During summer, graze 75% of cattle on private lease ground, then bring cattle back to the ranch in fall to manage crop residue that restricts plant growth and development. Gather cattle and ship to winter pasture.</p> <p>Build at least 5 brush piles measuring at least 12 feet in diameter by 8 feet tall in the Moon Pasture to provide escape cover for wildlife.</p>
<p>Mendiboure Cold Springs Ranch</p> <p>Deer Zone X5B</p> <p>Lassen</p> <p>1,880 Acres</p>	<p>Authorized Harvest: 1 forked horn or better buck deer</p> <p>Issue 1 buck deer tag for the period of October 6, 2025, through November 23, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p>	<p>Maintain 2-acre young aspen exclosure above Hall Cabin.</p> <p>Maintain and repair all exterior fencing that received damage from the W-5 Cold Springs Fire.</p> <p>Cut at least 50 mountain mahogany branches with ripe seeds and disperse on</p>

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ANNUAL RENEWALS, 2025-2026  
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<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
Mendiboure Cold Springs Ranch Cont.		<p>the ground in order to recruit young plants.</p> <p>Mechanically remove at least 20 western junipers from near East Spring.</p> <p>Maintain East Meadow spring by checking and repairing any damaged parts.</p> <p>Continue rotational cattle grazing between 2 pastures so that the residual dry matter does not fall below 40% using the Double-Weight sampling technique.</p>
<p>Mill Creek Ranch</p> <p>Deer Zone C4</p> <p>Tehama</p> <p>21,094 Acres</p>	<p>Authorized Harvest: 26 forked horn or better buck deer</p> <p>Issue 26 buck deer tags for the period of September 16, 2025, through November 30, 2025.</p>	<p>Continue the large-scale feral cattle removal project from the property in which this years goal is to have a total of 300 cattle removed by the end of this year.</p> <p>Maintain the 2 previously enhanced spring sites by maintaining the wildlife friendly fencing allowing for riparian vegetation to regrow.</p> <p>Protect and enhance at least 1 spring site by installing wildlife friendly fencing to allow for riparian vegetation to regrow.</p> <p>Remove at least 0.50 mile of internal wildlife unfriendly fencing.</p>
<p>Observation Peak Ranch</p> <p>Deer Zone X5B</p> <p>Lassen</p> <p>640 Acres</p>	<p>Authorized Harvest: 1 forked horn or better buck deer</p> <p>Issue 1 buck tag for the period of September 25, 2025, through November 30, 2025.</p> <p>No person shall take more than one buck deer annually in the X zones.</p>	<p>Seed 1 acre of mountain mahogany at a rate of 0.20 lbs./acre.</p> <p>Maintain wildlife friendly fencing on the property.</p> <p>Install a 750-gallon guzzler with wildlife friendly fencing.</p>

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<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Pondosa</p> <p>Deer Zone X1</p> <p>Siskiyou</p> <p>27,734 Acres</p>	<p>Authorized Harvest: 3 either-sex deer, 2 bull elk, and 2 antlerless elk</p> <p>Issue 3 either-sex deer tags of which no more than 2 bucks may be harvested for the period of September 15, 2025, through November 15, 2025.</p> <p>No antlerless deer or elk shall be harvested before September 15, 2025.</p> <p>Issue 2 bull elk tags and 2 antlerless elk tags for the period of September 1, 2025, through November 25, 2025.</p>	<p>Restore at least 50 acres of aspen and meadow areas by removing encroaching conifer seedlings and saplings through the Black Cub THP.</p> <p>Maintenance on Tom Young meadow by removing new conifer growth.</p> <p>Continue ongoing study that utilizes trail cameras to estimate cow:calf ratios on the property.</p> <p>Aspen stem count and photo point surveys.</p>
<p>Red Rock Ranch</p> <p>Deer Zone X3B</p> <p>Lassen</p> <p>6,887 Acres</p>	<p>Authorized Harvest: 7 forked horn or better buck deer, 2 buck pronghorn antelope and 1 bull elk</p> <p>Issue 7 buck deer tags for the period of August 1, 2025, through November 30, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p> <p>Issue 2 buck pronghorn antelope tags for the period of August 1, 2025, through November 30, 2025.</p> <p>Issue 1 bull elk tag for the period of August 1, 2025, through November 30, 2025.</p>	<p>Remove at least 0.25 miles of field fencing to reduce wildlife entanglements.</p> <p>Install at least 0.25 miles of wildlife friendly fencing.</p> <p>Cut at least 50 acres of junipers to promote native beneficial forage and vegetation types.</p> <p>Maintain previously restored springs.</p> <p>Maintain Little Boot Lake and springs including yearly maintenance of the dam, spillway and spring.</p> <p>Install at least 2 beaver dam analogs to assist in better hydrologic function and riparian habitat restoration.</p>

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<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Red Rock Valley Farms</p> <p>Deer Zone X1</p> <p>Siskiyou</p> <p>5,562 Acres</p>	<p>Authorized Harvest: 3 either-sex deer and 1 bull elk</p> <p>Issue 3 either-sex deer tags for the period of September 1, 2025, through November 30, 2025.</p> <p>No antlerless deer shall be harvested before September 15, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p> <p>Only 1 buck deer shall be harvested after October 19, 2025.</p> <p>Issue 1 bull elk tag for the period of September 1, 2025 through December 30, 2025.</p>	<p>Selectively remove western juniper from at least 5 acres to improve shrub recruitment.</p> <p>Increase forage quality for wildlife by pruning bitterbrush and mechanically disturbing the soil within a 5-acre area.</p> <p>Maintain 12 miles of exclusion fencing on the ranch to prohibit grazing from trespass cattle.</p> <p>Install 1 wildlife friendly fence crossing.</p> <p>Retain 400 acres of alfalfa and timothy grass in the crop pivot corners to provide fall forage for wildlife.</p> <p>Restore and maintain 10-acre wetland by pumping water into it to provide year-round water for wildlife.</p> <p>Protect known pine and juniper trees that provide nesting and perching opportunities for raptors.</p> <p>Maintain Tecnor Spring by removing western juniper trees and silt as necessary.</p> <p>Attempt to remove feral horses and fence from the property.</p>
<p>Rickert Ranch</p> <p>Deer Zone C3</p> <p>Shasta</p> <p>4,441 Acres</p>	<p>Authorized Harvest: 10 forked horn or better buck deer and 1 bull elk</p> <p>Issue 10 buck deer tags for the period of August 1, 2025, through November 30, 2025.</p> <p>Only 6 buck deer shall be harvested after October 27, 2025.</p>	<p>Oak recruitment habitat improvement in French Creek. Fertilizing and oak spiking to increase acorn production in a 1-acre plot. (ORHI-4A)</p> <p>Repair and maintain the spring at Tule Pond. (SM-4A)</p> <p>Create at least 5 brush piles measuring at least 6 feet tall and 12 feet in diameter. (BP-4A)</p>



**PLM AREA LICENSE**  
**ANNUAL RENEWALS, 2025-2026**  
**PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS**

PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
Rickert Ranch Cont.	<p>In no case shall the number of tags issued be used to exceed the authorized harvest.</p> <p>The number of tag holders actively hunting shall not exceed the number of deer available to harvest.</p> <p>Issue 1 bull elk tag for the period of August 1, 2025, through November 30, 2025.</p>	<p>Brush crushing of mature brush along ½ mile of the Swede Creek north rim. (BCHI-4C)</p> <p>Install at least 4 wood duck boxes along Woodman Creek and north of Little Cow Creek. (WN-4A)</p> <p>Replant dryland forage plot in at least 1 acre. (FPD-4A)</p>
Roberts Ranch Deer Zone X1  Modoc  2,313 Acres	<p>Authorized Harvest: 2 forked horn or better buck deer, and 1 buck pronghorn antelope</p> <p>Issue 2 buck deer tags for the period of August 1, 2025, through November 30, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p> <p>Issue 1 buck pronghorn antelope tag for the period of August 1, 2025, through October 31, 2025.</p>	<p>Remove/ thin at least 5 acres of juniper trees.</p> <p>Create at least 15 brush piles that are at least 8 feet in diameter and 5 feet tall, located near springs and water sources.</p> <p>Meet with state and federal agencies to establish permanent wetlands.</p> <p>Limit cattle grazing to no more than 50 cow/calf pairs for the entire ranch and will be removed by September 15, 2024.</p>
Salt Creek Ranch Deer Zone B5  Tehama  640 Acres	<p>Authorized Harvest: 3 forked horn or better buck deer</p> <p>Issue 3 buck deer tags for the period of September 1, 2025, through November 30, 2025.</p>	<p>Continue to improve water retention ponds by repairing and plugging any leaks in the dams.</p> <p>Continue planting and maintain at least 25 acres of fields.</p> <p>Clear snags and implement erosion control measures for at least 5 acres due to the August Complex Fire.</p>

**PLM AREA LICENSE**  
**ANNUAL RENEWALS, 2025-2026**  
**PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS**

PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
<p>Schneider Ranch</p> <p>Deer Zone B1</p> <p>Mendocino</p> <p>5,222 Acres</p>	<p>Authorized Harvest: 6 forked horn or better buck deer</p> <p>Issue 6 buck deer tags for the period of August 1, 2025, through November 30, 2025.</p> <p>No more than 3 buck deer may be harvested after October 26, 2025.</p>	<p>Burn or mechanically treat at least 7 acres of decadent brush annually.</p> <p>Cultivate with equipment and irrigate the 1-acre Cabin food plot, which provides a year-round deer feeding area annually.</p> <p>Create at least 6 brush piles for wildlife cover. The piles will each be approximately 10 feet in diameter and 6 feet tall and will provide good habitat for both deer and quail.</p> <p>Burn at least 6 brush piles. The remnant charcoal and ashes are nutrient rich and deer roll in them, perhaps for control of external parasites.</p> <p>Inspect 6 previously improved springs and repair any damaged parts, clear any brush that is intruding on the collection galleries, cleaning out accumulated debris and mud, and ensure the box is structurally sound.</p>
<p>SL Ranch</p> <p>Deer Zone X3A</p> <p>Modoc</p> <p>7,500 Acres</p>	<p>Authorized Harvest: 4 forked horn or better buck deer and 1 buck pronghorn antelope</p> <p>Issue 4 buck deer tags for the period of August 1, 2025, through November 30, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p> <p>Issue 1 buck pronghorn antelope tag for the period of August 1, 2025, through September 30, 2025.</p>	<p>Use a combination of chainsaws and herbicides to remove western juniper from at least 5 acres.</p> <p>Flood 455 acres of harvested wild rice fields for waterfowl use.</p> <p>Maintain the livestock exclusion fence around the spring below Likely Mill to exclude cattle.</p> <p>Maintain 2 springs on Rocky Prairie and 1 pond by ensuring that fencing excludes cattle. Any damaged fences and structures will be repaired as necessary.</p> <p>Maintain the livestock exclusion fencing along the West Side Canal where willows are present.</p>

***PLM AREA LICENSE  
ANNUAL RENEWALS, 2025-2026  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
SL Ranch Cont.		Plant 200 willow shoots along the river in Area C.
<p>Walton Homestead Family, LLC</p> <p>Deer Zone X3A</p> <p>Lassen</p> <p>5,980 Acres</p>	<p>Authorized Harvest: 5 either-sex deer and 1 buck pronghorn antelope</p> <p>Issue 5 either-sex deer tags for the period of September 1, 2025, through November 30, 2025.</p> <p>No antlerless deer shall be harvested before September 15, 2025.</p> <p>No person shall take more than 1 buck deer annually in the X zones.</p> <p>Issue 1 buck pronghorn antelope tag for the period of August 1, 2025, through September 30, 2025.</p>	<p>Remove at least 80 acres of junipers yearly. The slash will be used to create wildlife brush piles measuring at least 12 feet in diameter and 6 feet in height.</p> <p>Complete the Horse Meadow Spring development including wildlife/ livestock watering system.</p> <p>Cattle grazing will be restricted every third year by only grazing March through June.</p> <p>Finalize water well, and a solar pump and storage tank will be installed along with piping and troughs to facilitate cattle watering out of the meadows.</p> <p>Maintain wildlife-friendly livestock enclosure fencing around springs and basins and use solar pumping or gravity flow to give cattle and wildlife water access outside the fence.</p> <p>Maintain aspen enclosure fencing and continue to remove junipers and pine trees within the enclosures.</p>

***PLM AREA LICENSE  
ANNUAL RENEWALS, 2025-2026  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
Willow Creek Ranch  Deer Zone C2  Shasta and Siskiyou  4,016 Acres	Authorized Harvest: 5 forked horn or better buck deer  Issue 5 buck deer tags for the period of September 1, 2025, through November 30, 2025.	Treat at least 1 acre of oak woodlands to remove encroaching conifers.  Meadow encroachment will be treated on 15 acres of seedlings using a weed eater with a blade. A minimum of 5 acres of large conifers will be removed from. encroaching the meadow area.  Beaver habitat improvement will be conducted in the meadow, a beaver deceiver device has been installed to allow beavers to populate the meadow. Beaver relocation program application has been submitted to CDFW.  Install at least 4 wood duck boxes in the meadow.  Manage at least 75 acres of mixed conifer forest to enhance openings and create wildlife habitat.

***NORTH CENTRAL REGION***

<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
360 Ranch  Deer Zone A  Yolo  9,493 Acres	Authorized Harvest: 8 forked horn or better buck deer  Issue 10 buck deer tags for the period of July 12, 2025 through November 30, 2025.	Mechanically remove with a tractor or brush ripping 8 acres of decadent brush.  Plant 8 acres of deer & wildlife mix to improve habitat for deer.  Install 2 wood duck boxes #2 & #3 on the Pistol Range Pond.  Repair or replace 2 water collection rain guzzlers (Petroleum Creek #2 Guzzler & Short Cut Rd. Guzzler) which will be between 300 – 500 gallons for wildlife.  Remove 200 feet of old barb wire fencing and replace with wildlife friendly wire on the quail pond.

***PLM AREA LICENSE  
ANNUAL RENEWALS, 2025-2026  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
360 Ranch Cont.		<p>Cattle grazing restricted to November 15<sup>th</sup> – May 15<sup>th</sup>.</p> <p>Create 4 wildlife brush piles measuring at least 15 feet in diameter and 7 feet tall and maintain the 4 created in year 1.</p> <p>Maintain 1 wood duck box #1 on the Quail Pond.</p> <p>Maintain 2 water collection rain guzzlers and cattle exclusion fencing (Long Range Guzzler &amp; Petroleum Creek #1 Guzzler).</p> <p>Maintain and provide maintenance on the one well that provides water year-round to the Quail Pond including cattle exclusion fencing.</p> <p>Ten game cameras will be deployed across the ranch to inventory wildlife.</p>
<p>Anderson Ranch Deer Zone C-4</p> <p>Glenn 400 Acres</p>	<p>Authorized Harvest: 5 forked horn or better buck deer and 5 antlerless deer</p> <p>Issue 5 buck deer tags for the period of August 16, 2025 through November 30, 2025.</p> <p>Issue 5 antlerless deer for the period of August 16, 2025 through November 30, 2025.</p>	<p>Establish 3 owl nesting boxes.</p> <p>Plant 100 acres of cover crop.</p> <p>Maintain 2 brush piles (10 feet x 10 feet x 6 feet) at the edges of the walnut orchard.</p> <p>Maintain 5 blue bird nesting boxes, 2 turtle basking logs, 20 oak tree plantings and 15 coyote brush plantings.</p> <p>Conduct 2 deer surveys.</p>
<p>Angel Slough Deer Zone C-4</p> <p>Butte 855 Acres</p>	<p>Authorized Harvest: 5 forked horn or better buck beer and 6 antlerless deer</p> <p>Issue 5 buck deer tags for the period of August 16, 2025 through November 30, 2025.</p>	<p>Place 5 blue bird boxes around edges of walnut orchard.</p> <p>Keep water in east boundary pond.</p> <p>Plant 25 acres of cover crops down walnut rows.</p>

***PLM AREA LICENSE  
ANNUAL RENEWALS, 2025-2026  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
Angel Slough Cont.	Issue 6 antlerless deer tags for the period of August 16, 2025 through November 30, 2025.  1 tag to be filled by a junior hunter.	Maintain 5 wood duck boxes.  Re-plant any previous plantings that did not survive (200).  Conduct 2 deer surveys.
Bird Haven Ranch  Deer Zone D-3  Glenn  2,500	Authorized Harvest: 6 forked horn or better buck deer and 2 either-sex deer  Issue 6 buck deer tags for the period of August 16, 2025 through November 30, 2025.  Issue 2 either-sex deer tags for junior hunters for the period of August 16, 2025 through November 30, 2025.  1-2 of the buck deer tags to be donated to a non-profit or sold to generate revenue for any such non-profit.	Maintain current conditions by irrigating approximately 1,320 acres of wetland habitat. This includes mowing, burning, grinding, and contouring units to promote early successional plants, improve water flow and reduce unwanted decadent vegetation.  Maintain and monitor a minimum of 110 wildlife nesting boxes.  Spray, cut/remove 1-2 acres of Himalayan Blackberry & other invasive species within Riparian & Meadow Habitats.  Plant at least 10 separate ( $\geq 25$ acres) foraging/nesting habitat food plots (corn, safflower, oats, milo etc.)  Spot Spray, mow/disc 150 acres of noxious weeds to promote early successional forage plants.  Restore and enhance 25 acres of wetland habitat (tasks: clean replace contour swale (s), remove downed trees, mowing, spraying noxious weeds, burning, and discing)  Conduct 2 deer surveys, 1 spot light survey and 1 trail camera survey.

***PLM AREA LICENSE  
ANNUAL RENEWALS, 2025-2026  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>Deseret Farms</p> <p>Deer Zone C-4</p> <p>Butte</p> <p>11,114 Acres</p>	<p>Authorized Harvest: 15 forked horn or better buck deer and 25 antlerless deer</p> <p>One tag to be designated for junior only.</p> <p>Issue 15 deer tags to take forked horn or better bucks for the period of November 1, 2025 through December 31, 2025.</p> <p>Issue 25 tags to take antlerless deer for the period of November 1, 2025 through December 31, 2025.</p>	<p>Burn/disc/mow 20 acres within Soto Lake/adjacent ponds.</p> <p>Improve 2 basking mounds and maintain previously improved mounds.</p> <p>Remove blackberry bushes on 2 acres.</p> <p>Remove wild pig.</p> <p>Maintain 3 brush piles 10 feet x10 feet x 5 feet minimum.</p> <p>Maintain 10 wood duck boxes.</p> <p>Maintain 10 owl features (boxes and perches).</p> <p>Plant native species: 10 individuals or seed 1 acre.</p>
<p>Magers Ranch</p> <p>Deer Zone C4</p> <p>Butte</p> <p>1,400 Acres</p>	<p>Authorized Harvest: 2 forked horn or better buck deer</p> <p>Issue 2 buck deer tags for the period of August 16th, 2025 through November 30th, 2025.</p>	<p>Install 3 wood duck boxes next to Butte Creek and Butte Slough and maintain previously installed boxes.</p> <p>Maintain 1 owl box along high line irrigation ditch.</p> <p>Install 2 turtle structures in Butte Slough and Durham Slough and maintain previously installed structures.</p> <p>Leave growth (grass and weeds) on every other check of all rice fields – 637 acres.</p> <p>&gt;50% water control structures blocked/left-flooded until March 1st – 637 acres.</p> <p>Disc and level the north meadow – 1 acre.</p> <p>Plant 25 one-gallon coyote brush plants in the north meadow.</p>

***PLM AREA LICENSE  
ANNUAL RENEWALS, 2025-2026  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>
<p>M&amp;T Chico Ranch</p> <p>Deer Zone C4</p> <p>Butte</p> <p>5,332 Acres</p>	<p>Authorized Harvest: 5 forked-horn or better buck deer and 10 antlerless deer</p> <p>Issue 5 buck deer tags for the period of August 16th, 2025 through December 31<sup>st</sup>, 2025.</p> <p>Issue 10 antlerless deer tags for the period of August 16th, 2025 through December 31<sup>st</sup>, 2025.</p> <p>Due to human safety concerns, deer will not be actively hunted during the nut and fruit harvest season on the ranch, that runs from September 1 through November 1.</p>	<p>Maintain fencing or other options to manage cattle grazing in riparian areas.</p> <p>Improve foraging and nesting habitat for herons and egrets in rookery and for Swainson's hawk and Peregrine falcon.</p> <p>Maintain cattle grazing levels at approximately 100 head or less.</p> <p>Treat 20 acres of yellow star thistle, cape ivy, or tree-of-heaven with herbicide.</p> <p>Plant native grasses/shrubs in star thistle control areas.</p> <p>Plant native riparian trees in chinese tree of heaven control areas.</p> <p>Maintain or replace 10 Barn owl and 30 wood duck nest boxes and bluebird boxes.</p> <p>Perform annual fall deer count to include in the annual Sacramento River Herd Survey Data.</p> <p>Release 200 pheasants to establish population.</p>
<p>Ordway Ranch</p> <p>Deer Zone D-5</p> <p>Calaveras</p> <p>850 Acres</p>	<p>Authorized Harvest: 6 forked horn or better buck deer</p> <p>Issue 6 buck deer tags for the period of September 27, 2025 through November 30, 2025.</p>	<p>Maintain 3 water sources for wildlife (including 3 solar-powered wells).</p> <p>Maintain 850 acres of fencing.</p> <p>Maintain 4 brush piles 10 feet wide x 6 feet tall.</p> <p>No cattle grazing in Pasture B.</p> <p>Maintain 53 acres of cattle exclusion fencing along riparian areas.</p> <p>Control invasive weeds through physical removal or spraying on 5-10 acres.</p>



***PLM AREA LICENSE  
ANNUAL RENEWALS, 2025-2026  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
Ordway Ranch Cont.		<p>Create 10 water bars to help with erosion Plant 1 acre of perennial grasses.</p> <p>Conduct 1 deer survey.</p> <p>Annual inspection and repair of 47,250 feet of perimeter fencing.</p>
<p>Smith Flat Ranch</p> <p>Deer Zone A</p> <p>Yolo</p> <p>1,024 Acres</p>	<p>Authorized Harvest: 5 forked horn or better buck deer</p> <p>Issue 10 buck deer tags to for the period of July 12, 2025 through November 30, 2025.</p> <p>1 tag will be issued to a junior hunter.</p>	<p>Maintain the following water systems: Smith Flat - fill two 2,500-gallon tanks, repair and maintain system.</p> <p>Shooting Flat – fill 2,500-gallon tank, repair and maintain system.</p> <p>Desperation Tank – fill 2,500-gallon tank, repair and maintain system.</p> <p>Spring Box – repair and maintain system.</p> <p>Reservoir Guzzler and 500 Gallon Tank.</p> <p>Maintain quail brush piles (4) to a minimum size of 15 feet wide by 6 feet high.</p> <p>Convert shooting flat waterer so it is more easily accessible by wildlife.</p> <p>Create an additional 2 brush piles.</p> <p>Plant 100 fruit trees/shrubs and irrigate.</p> <p>Re-plant food plots/native grass seed at Smith Flat and Shooting Flat.</p> <p>Limit cattle grazing to 60 head in the smith flat area (500 acres) for 8 weeks.</p>

**PLM AREA LICENSE  
ANNUAL RENEWALS, 2025-2026  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS**

PLM Area	2025 Proposed Season and Harvest	Habitat Improvement Program
Sugarloaf-Bangor Ranch  Deer Zone D-3  Yuba  2,626 Acres	<p>Authorized Harvest: 12 forked horn or better buck deer, 25 turkey, 200 quail, and 2 black bear</p> <p>Issue 12 buck deer tags for the period of September 20, 2025 through November 30, 2025.</p> <p>Issue 25 turkey tags for the periods of October 1, 2025 through January 15, 2026 (fall season, either-sex harvest) and March 1, 2026 through May 15, 2026 (spring season, bearded turkey only harvest).</p> <p>Issue 200 quail tags for the period of September 1, 2025 through February 28, 2026. Additional orders are approved in 100 seal increments up to the authorized harvest.</p> <p>Issue 2 bear tags to take 2 bear for the period of September 20, 2025 to December 31, 2025 or when the statewide bear quota has been fulfilled.</p>	<p>Maintain cattle stocking rate at or below 200 cow/calf pairs.</p> <p>Cattle grazing limited to December 1 to May 15.</p> <p>Maintain hot line around Round Lake to keep livestock from riparian plantings (willows and cottonwoods).</p> <p>Maintain solar-operated well to provide a consistent water source for Round Lake.</p> <p>Maintain water delivery system (piping and ditch) to wood duck pond.</p> <p>Maintain 6 brush piles (10 feet x 10 feet x 6 feet) in areas near water sources.</p> <p>Construct 6 new brush piles (10 feet x 10 feet x 6 feet) on Quail Knob.</p> <p>Maintain 6 blue bird boxes.</p> <p>Maintain 2 wood duck boxes at Round Lake.</p> <p>Install 1 wood duck box on wood duck Pond.</p>

**SOUTH COAST REGION**

Santa Catalina Island  Deer Zone D-15  Los Angeles  42,100 Acres	<p>Authorized Harvest: 200 deer</p> <p>Issue 100 either-sex deer tags for the period of July 12, 2025 to December 26, 2025.</p> <p>Upon written request of the licensee on or before October 1, 2025, issue up to an additional 100 either-sex deer tags to accomplish the authorized harvest. Any tags</p>	<p>Continue annual Catalina Island fox recovery activities including: census, vaccination of 300 individuals against CDV/rabies, and monitoring 50 radio collared individuals.</p> <p>Continued monitoring of island for non-native mammals (e.g., raccoons).</p> <p>Continued bison herd management through contraception (maintain &lt;150).</p>
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***PLM AREA LICENSE  
ANNUAL RENEWALS, 2025-2026  
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS***

Santa Catalina Island Cont.	not requested during this request-period can be rolled over into and allocated during the next request period.	<p>Continue animal and plant baseline monitoring activities.</p> <p>Continue to optimize weather data collection and analysis.</p> <p>Continue invasive plant removal through contracts with the California Institute of Environmental Studies.</p> <p>Continue monitoring and maintenance of deer exclosures erected post-fire and for rare species.</p> <p>Continue and expand education and outreach through Naturalist Training, Kids in Nature, Island Scholars, Families in Nature, and Nature Works programs.</p>
<b>PLM Area</b>	<b>2025 Proposed Season and Harvest</b>	<b>Habitat Improvement Program</b>

**INLAND DESERTS REGION**

<p>Big Morongo Springs Ranch</p> <p>DEER ZONE D-14</p> <p>SAN BERNARDINO</p> <p>6,632 ACRES</p>	<p>Authorized Harvest: 10 forked horn or better buck deer, 1 antlerless deer, and 2 black bear</p> <p>Issue 10 buck deer tags for the period of September 11, 2025 through December 4, 2025.</p> <p>Issue 2 bear tags to take black bear for the period of September 11, 2025 through December 4, 2025 or when the statewide quota of 1,700 is met.</p>	<p>Continue non-use by livestock.</p> <p>Repair or replace all pipelines and tanks damaged by Sawtooth wildfire.</p> <p>Repair fire-damaged roads within PLM.</p> <p>Continue monitoring of water sources with trail cameras.</p>
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## Memorandum

**Date:** May 23, 2025

**To:** Melissa Miller-Henson  
Executive Director  
Fish and Game Commission

**From:** Charlton H. Bonham  
Director

**Subject:** Request for 30-day Extension, Gerry's Curly-Leaved Monardella Petition  
Evaluation

The California Department of Fish and Wildlife (Department) requests a 30-day extension of time pursuant to Fish and Game Code section 2073.5 to allow the Department additional time to analyze and evaluate the petition to list Gerry's curly-leaved monardella (*Monardella sinuata* subsp. *gerryi*) under the California Endangered Species Act and to complete the evaluation report. This extension would extend the Department's review time from 90 to 120 days and would change the due date of the Department's evaluation report from May 20, 2025 to June 19, 2025.

If you have any questions or need additional information, please contact Ryan Mathis, Acting Habitat Conservation Planning Branch Manager, at [NativePlants@wildlife.ca.gov](mailto:NativePlants@wildlife.ca.gov) or [REDACTED].

cc: Joshua Grover  
Deputy Director  
Ecosystem Conservation Division

Isabel Baer  
Environmental Program Manager  
Habitat Conservation Planning Branch

Kristi Lazar  
Senior Environmental Scientist (Specialist)  
Habitat Conservation Planning Branch

**California Fish and Game Commission**  
**DRAFT Notice of Findings**  
**for**  
**Mojave Desert Tortoise (*Gopherus agassizii*)**  
**May 27, 2025 DRAFT**

**NOTICE IS HEREBY GIVEN** that the California Fish and Game Commission (Commission), at a meeting on April 17-18, 2024, found pursuant to California Fish and Game Code Section 2075.5 that the information contained in the petition to list the species Mojave desert tortoise (*Gopherus agassizii*) and other information in the record before the Commission, warrants adding Mojave desert tortoise to the list of endangered species under the California Endangered Species Act (CESA; Fish and Game Code, Section 2050 et seq.). (See also California Code of Regulations, Title 14, Section 670.1, subsection (i))

**NOTICE IS ALSO GIVEN** that, at its June 11-12, 2025, meeting, the Commission adopted the findings herein outlining the reasons for its determination.

## **I. Background and Procedural History**

### ***Prior Listing History***

The Commission listed desert tortoise (*Gopherus agassizii*) as a threatened species under the California Endangered Species Act (CESA) in 1989. The U.S. Fish and Wildlife Service listed it under the federal Endangered Species Act (ESA) in 1990. As explained below, 2011 studies concluded that the species complex of desert tortoise consists of two species, with those present in California being classified as *Gopherus agassizii* and commonly referred to as Mojave desert tortoise.

### ***Petition History***

On March 23, 2020, Defenders of Wildlife, the Desert Tortoise Council, and the Desert Tortoise Preserve Committee submitted a petition to the Commission to change the listing status of desert tortoise (*Gopherus agassizii*; hereafter referred to as Mojave desert tortoise) from threatened to endangered under CESA. The Commission reviewed the petition for completeness and, on April 13, 2020, pursuant to Section 2073 of the California Fish and Game Code, referred the petition to the California Department of Fish and Wildlife (Department) for evaluation. The Commission gave public notice of receipt of the petition on May 1, 2020 (California Regulatory Notice Register 2020, No. 18-Z, p.693). The Department transmitted to the Commission the Department's petition evaluation on July 23, 2020 and, on August 20, 2020, the Commission publicly received the Department's petition evaluation.

At its October 14, 2020 meeting, the Commission determined that listing may be warranted, and subsequently provided notice regarding the Mojave desert tortoise's status as a candidate species (California Regulatory Notice Register 2020, No. 44-Z, p. 1445).

### ***Status Review Overview***

The Commission's action, designating Mojave desert tortoise as a candidate species, triggered the Department's process for conducting a status review to inform the Commission's decision on whether to list the species.

On January 9, 2024, the Department transmitted to the Commission the Department's report, *Status Review for Mojave Desert Tortoise (Gopherus agassizii) Report to the Fish and Game Commission*, dated February 2024. The Commission publicly identified receipt of the Department's status review report as part of the Commission's February 14-15, 2024 meeting materials. On April 18, 2024, the Commission found that the information contained in the petition to change the listing status of Mojave desert tortoise and other information in the record before the Commission, warranted listing Mojave desert tortoise as an endangered species under CESA.

### ***Species Description***

The Mojave desert tortoise is a long-lived, desert-dwelling tortoise. Desert tortoises are reptiles within the order Testudines, family Testudinidae, genus *Gopherus*. The genus *Gopherus* consists of North America's land tortoises.

When the Commission listed desert tortoise as threatened in 1989, *Gopherus agassizii* was understood to range from southeastern California, across southern Nevada, through western Arizona, and south into Sonora and Sinaloa, Mexico. In 2011, studies of tortoise genetics, morphometrics, and ecology led experts to conclude that the species complex formerly known as "desert tortoise" in fact consists of two separate species, Mojave desert tortoise and Sonoran desert tortoise (*Gopherus morafka*) (Murphy et al. 2011, Iverson et al. 2017). Mojave desert tortoise, also known as Agassiz's desert tortoise, retains the original binomial scientific name (*G. agassizii*) and ranges across the deserts of southeastern California, southern Nevada, and small areas of Arizona and Utah north of the Colorado River, as well as southwestern Utah. In California, the range of the Mojave desert tortoise includes the Mojave Desert and portions of the Sonoran and Great Basin deserts.

Mojave desert tortoise habitat typically consists of alluvial fans and plains that facilitate the digging of burrows. Mojave desert tortoises also need sufficient forage plants, as well as larger shrubs and bushes for shade and protection of burrows, and for feeding on annual forbs, annual and perennial grasses, herbaceous perennial plants, and some cacti (Berry and Murphy 2019). Mojave desert tortoises occur in very low densities or are absent where shrub cover is sparse, precipitation is low, and annual food plants are available only intermittently.

The carapace of adults ranges in size from 178 millimeters to over 370 millimeters in length. Mojave desert tortoises make extensive use of underground burrows to regulate body temperature and as protection from predators. Studies have demonstrated male home range sizes of 39–47 hectare and female home range sizes of 14–17 hectare (Harless et al. 2009). Home ranges of individuals can overlap.

Mojave desert tortoises are long-lived and females are thought to become sexually mature at 12–20 years old (mean 18.8; Medica et al. 2012), depending on locality (Woodbury and Hardy 1948, Turner et al. 1986, Curtin et al. 2009). Generation time is estimated to be around 25 years (U.S. Fish and Wildlife Service 1994). Mating occurs in late summer and fall, and females can mate with multiple males (Davy et al. 2011).

Females typically lay one or two clutches of eggs (about six eggs per clutch) per year; however, some females have been documented to lay more than two clutches (Ennen et al. 2012, Mitchell et al. 2021). Tortoise nests are typically placed near the entrance to the burrow or within suitable soil (Ennen et al. 2012), and there is no parental care once eggs have

hatched (Berry and Murphy 2019). Newly hatched tortoises are about 4–5 centimeters in length (Bjurlin and Bissonette 2004) and their shells do not fully ossify (harden) until they are 5–7 years old.

## **II. Statutory and Legal Framework**

The Commission, established by the California State Constitution, has exclusive statutory authority under California law to designate endangered, threatened, and candidate species under CESA (California Constitution, Article IV, Section 20, subdivision (b); California Fish and Game Code Section 2070). The CESA listing process for this species began in the present case with a petition submitted to the Commission. The regulatory and legal process that ensued is described in some detail in the preceding section, along with related references to the Fish and Game Code and controlling regulations. The CESA listing process generally is also described in some detail in published appellate case law in California, including:

- Natural Resources Defense Council v. California Fish and Game Commission (1994) 28 Cal.App.4th 1104;
- Mountain Lion Foundation v. California Fish and Game Commission (1997) 16 Cal.4th 105;
- California Forestry Association v. California Fish and Game Commission (2007) 156 Cal.App.4th 1535;
- Center for Biological Diversity v. California Fish and Game Commission (2008) 166 Cal.App.4th 597;
- Central Coast Forest Association v. California Fish and Game Commission (2017) 2 Cal.5th 594;
- Central Coast Forest Association v. California Fish and Game Commission (2018) 18 Cal.App.5th 1191; and
- Almond Alliance of California v. California Fish and Game Commission (2022) 79 Cal.App.5th 337.

The “is warranted” determination stems from Commission obligations established by Fish and Game Code Section 2075.5. Under the provision, the Commission is required to make one of two findings for a candidate species at the end of the CESA listing process; namely, whether listing a species is warranted or is not warranted. Here, the Commission made the finding under Section 2075.5, subdivision (e)(2) that listing is warranted.

The Commission was guided in making its determinations by statutory provisions and other controlling law. The Fish and Game Code, for example, defines an endangered species under CESA as “a native species or subspecies of a bird, mammal, fish, amphibian, reptile or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease” (Section 2062). Similarly, the Fish and Game Code defines a threatened species under CESA as “a native species or subspecies of a bird, mammal, fish, amphibian, reptile or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by this chapter” (Section 2067).

The Commission also considered California Code of Regulations, Title 14, Section 670.1, subsection (i)(1)(A), in making its determination. The provision provides, in pertinent part, that the Commission will list the species or subspecies as endangered or threatened under CESA if the Commission determines that its continued existence is in serious danger or is threatened by any one or any combination of six factors:

1. Present or threatened modification or destruction of its habitat,
2. overexploitation,
3. predation,
4. competition,
5. disease, or
6. other natural occurrences or human-related activities.

Fish and Game Code Section 2070 provides similar guidance, providing that the Commission shall add or remove species from the list of endangered and threatened species under CESA only upon receipt of sufficient scientific information that the action is warranted. Similarly, CESA provides that it is the policy of the state, not specific to the Commission per se, that all state agencies, boards, and commissions shall seek to conserve endangered and threatened species and shall utilize their authority in furtherance of the purposes of CESA (Fish and Game Code Section 2055). The statutory guidance does not compel a particular determination by the Commission in the CESA listing context. Nevertheless, “[l]aws providing for the conservation of natural resources’ such as the CESA are of great remedial and public importance and thus should be construed liberally.” (*California Forestry Association v. California Fish and Game Commission*, supra, 156 Cal.App.4th at pp. 1545-1546, citing *San Bernardino Valley Audubon Society v. City of Moreno Valley* (1996) 44 Cal.App.4th 593, 601; Fish and Game Code sections 2051 and 2052.)

Finally, in considering the six identified factors, CESA and controlling regulations require the Commission to actively seek and consider related input from the public and any interested party (see, e.g., Fish and Game Code, sections 2071, 2074.4 and 2078; California Code of Regulations, Title 14, Section 670.1, subsection (h)). The related notice obligations and public hearing opportunities before the Commission are also considerable (Fish and Game Code sections 2073.3, 2074, 2074.2, 2075, 2075.5 and 2078; California Code of Regulations, Title 14, Section 670.1, subsection (c), (e), (g) and (i); see also California Government Code Section 11120 et seq.). The referenced obligations are in addition to the requirements prescribed for the Department in the CESA listing process, including an initial evaluation of the petition, a related recommendation regarding candidacy, and a review of the candidate species’ status, culminating with a report and recommendation to the Commission as to whether listing is warranted based on the best available science (Fish and Game Code sections 2073.4, 2073.5, 2074.4 and 2074.6; California Code of Regulations, Title 14, Section 670.1, subsections (d), (f) and (h)).

### **III. Factual and Scientific Bases for the Commission’s Final Determination**

The factual and scientific bases for the Commission’s determination that designating Mojave desert tortoise as an endangered species under CESA is warranted are set forth in detail in the Commission’s record of proceedings, including the petition; the Department’s petition evaluation report; the Department’s status review report; written and oral comments received



from members of the public, the regulated community, tribal entities, and the scientific community; and other evidence included in the Commission's record of proceedings, which is incorporated herein by reference.

The Commission determines that the continued existence of Mojave desert tortoise in the state of California is in serious danger or threatened by one or a combination of six factors as required by California Code of Regulations, Title 14, Section 670.1, subsection (i)(1)(A):

1. Present or threatened modification or destruction of its habitat,
2. overexploitation,
3. predation,
4. competition,
5. disease, or
6. other natural occurrences or human-related activities.

The Commission also determines that the information in the Commission's record constitutes the best scientific information available and establishes that designating Mojave desert tortoise as an endangered species under CESA is warranted. Similarly, the Commission determines that Mojave desert tortoise is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease.

The items highlighted here and detailed in the following threats section represent only a portion of the complex issues aired and considered by the Commission during the CESA listing process for Mojave desert tortoise. Similarly, the issues addressed in these findings represent some, but not all, of the evidence, issues, and considerations affecting the Commission's final determination. Other issues aired before and considered by the Commission are addressed in detail in the record before the Commission.

### ***Background***

The Commission bases its "is warranted" finding for Mojave desert tortoise most fundamentally on its determination that Mojave desert tortoise qualifies as a "subspecies" as specified in CESA sections 2062 and 2067. The qualification is based on the evaluation of Mojave desert tortoise as an independent, separable, and important population, with a substantial risk of extinction in the foreseeable future within the meaning of CESA.

### ***Threats***

Mojave desert tortoise is endangered due to:

- Present or threatened modification or destruction of its habitat (see, e.g., Department's status review report at pages 32-37 and 62-64, and references cited therein),
- predation (see, e.g., Department's status review report at pages 40-43 and 62-64, and references cited therein), and
- other natural occurrences or human-related activities, particularly:
  - Climate change (see, e.g., Department's status review report at pages 43-46 and 62-64, and references cited therein),

- Vehicle strikes, roads, and fencing (see, e.g., Department's status review report at pages 37-39 and 62-64, and references cited therein),
- Fire (see, e.g., Department's status review report at pages 46-47 and 62-64, and references cited therein), and
- Impacts from invasive and non-native species (see, e.g., Department's status review report at pages 39-40 and 62-64, and references cited therein).

The Commission finds these factors to result in a significant threat to the continued existence of Mojave desert tortoise as explained in the Department's status review report. This finding and the Department's explanation are supported by the whole of the record before the Commission.

#### **IV. Final Determination by the Commission**

The Commission has weighed and evaluated the information for and against designating Mojave desert tortoise as an endangered species under CESA, including scientific and other general evidence in the petition; the Department's petition evaluation report; the Department's status review report; the Department's related recommendations; written and oral comments received from members of the public, the regulated community, various public agencies, and the scientific community; and other evidence included in the Commission's record of proceedings.

Based upon the evidence in the record, the Commission has determined that the best scientific information available indicates the continued existence of Mojave desert tortoise is in serious danger or threatened by modification or destruction of the species' habitat, predation, or other natural occurrences or human-related activities, where such factors are considered individually or in combination (see, generally, California Code of Regulations, Title 14, Section 670.1, subsection (i)(1)(A); Fish and Game Code sections 2062 and 2067).

The Commission determines that there is sufficient scientific information to indicate that designating Mojave desert tortoise as an endangered species under CESA is warranted, and that, with adoption and publication of these findings, Mojave desert tortoise shall be listed as endangered for purposes of its legal status under CESA.

# Memorandum

Date: June 5, 2025

Signed original on file  
Received 6/6/2025

To: Melissa Miller-Henson  
Executive Director  
Fish and Game Commission

From: Charlton H. Bonham  
Director

Subject: **Agenda Item for the June 11, 2025, Fish and Game Commission Meeting Duck Stamp Proposals for Fiscal Year 2025-26**

Pursuant to Fish and Game Code § 3702-3705, the Department of Fish and Wildlife (Department) submits the attached summary of proposed projects to the Fish and Game Commission (Commission) for consideration and approval for funding from the Duck Stamp Dedicated Account for the Fiscal Year (FY) 2025-26. These projects were reviewed by the Department and the Duck Stamp Advisory Committee.

The Account's estimated beginning balance will be \$3,444,000 on July 1, 2025, which includes the estimated revenue of \$1,604,000 from the sale of duck stamp validations during FY 2024-25. The Department proposes to spend revenues to accomplish the goals established for the Duck Stamp Dedicated Account as authorized.

For FY 2025-26, expenditure authority from this fund is \$1,939,000. After deducting the maximum allowable administrative overhead cost (limited to 6% per §3701 or \$116,340), and the mandated amount portioned to Canada (\$2.25 per stamp/validation per §3704 or approximately \$145,000 calculated based on the 2024 license year duck stamp validations), a total of \$1,677,783 is available for new and ongoing projects.

The Department is proposing seven new projects for funding totaling \$1,283,440. The attached list includes all projects recommended, including ongoing projects (approved in past years) for continued authorization. The new and ongoing projects in California total \$1,677,783. This figure includes contingency funding to allow for emergencies (drought or other) or project costs that differ from the original estimates; increasing as of late because of supply chain and inflation causes.

Melissa Miller-Henson, Executive Director  
Fish and Game Commission  
May 30, 2025  
Page 2

As always, the Department appreciates the Commission's consideration of our proposal and requests its approval for funding of the attached recommended projects. If you have any questions regarding this item, please contact Scott Gardner, Chief, Wildlife Branch, at (916) 801-6257.

Attachment

cc: Department of Fish and Wildlife

Chad Dibble, Deputy Director  
Wildlife and Fisheries Division

Dan Reagan, Deputy Director  
Fiscal Services Division

Scott Gardner, Chief  
Wildlife Branch

Melanie Weaver  
Waterfowl Program Coordinator  
Wildlife Branch

Nicole Nelson, Chief  
Budget Branch

FILE: D, DD-WFD

**Summary of Department Recommendations**  
**FY 2025-26 California Duck Stamp**  
(project costs rounded to nearest dollar)

**Canada Habitat Project**

**Wetland and Upland Conservation – Alberta/Saskatchewan, Canada.....\$144,878**

Establish a conservation easement and or restore wetlands associated with key breeding uplands in Alberta or Saskatchewan for pintail. Specific project parameters are still in development with the landowner. This project will also be matched by North America Wetland Conservation Act dollars.

**Ongoing Projects - California**

**Duck Banding (pintail and mallards) – California Waterfowl Association.....\$77,000**

This is a cooperative project to maintain sufficient banded samples of pintail and mallards to assess harvest and survival rates, as well as inputs for the Western Mallard Model (provide adaptive regulatory approach for establishing hunting frameworks in the Pacific Flyway).

**CA VCF Portion of Breeding Population Survey-Fuel.....\$20,000**

This project funds the helicopter portion of the CA Breeding Population Survey; used to correct what observers miss in the fixed-wing portion of survey.

**Tule Greater White-fronted Goose Population Study.....\$15,000**

This project will continue population estimation, habitat use, and distribution by purchasing and marking birds with radio transmitters.

**Department of Fish and Wildlife – Internal Expenditures .....\$123,714**

This funding provides the match for the Pittman Robertson Act funding for the Waterfowl Program in the Wildlife Branch as well as region staff participating in waterfowl surveys.

**Department of Fish and Wildlife – Duck Stamp Administration .....\$3,500**

This funding provides for the delivery of physical stamps to purchasers, as required under Fish and Game Code, and other administrative charges related to ALDS.

**Department of Fish and Wildlife – Contingency Fund.....\$155,129**

This funding provides the ability to cover emergencies (drought related or otherwise) and or cost overruns on new and existing projects caused supply shortages.

**New Projects – California**

**Honey Lake Wildlife Area – Fleming Unit 6B2.....\$184,131**

Enhance 54 acres of semi-permanent wetland habitat by refurbishing levees, grading, swales/potholes, and ditch cleaning.

**Willow Creek Wildlife Area-Units 10 & 14.....\$188,097**

Enhance 135 seasonal wetland acres by conducting a topographic survey for design, refurbishing levees, swales and replacing water control structures.

<b>Gray Lodge Wildlife Area-Field 93.....</b>	<b>\$201,024</b>
Restore 60 semi-permanent wetland acres by removing levees, refurbishing levees, grading/swales, islands/loafing bars and tule transplants.	
<b>Yolo Bypass Wildlife Area-Four Risers Fields 4 &amp; 5.....</b>	<b>\$263,764</b>
Enhance 49 wetland and 42 upland acres by topographic survey, grading, swales, loafing islands, tule transplants, refurbishing levees and native grass/forb seeding.	
<b>Grizzly Island Wildlife Area-Pond 11.....</b>	<b>\$170,437</b>
Enhance 345 wetland acres by replacing water control structures, swales, refurbishing levees, and invasive species removal.	
<b>North Grasslands Wildlife Area-China Island Unit.....</b>	<b>\$262,896</b>
Enhance 168 wetland acres by grading, swales, loafing islands, repairing traveling screen including solar panel array, wiring and fencing.	
<b>White-fronted Goose Genome Project.....</b>	<b>\$13,091</b>
Provide a genome wide metric to determine genetic diversity for Pacific and Tule greater white-fronted geese.	

**Staff Summary for December 11-12, 2024**  
**For Background Purposes Only**

## 16. Golden Mussel Emergency Regulation

### Today's Item

Information ☐

Action ☒

Discuss and consider taking emergency action to add golden mussel (*Limnoperna fortunei*) to the list of animals restricted from live importation, transportation and possession.

### Summary of Previous/Future Actions

- Today's adoption hearing

**December 11-12, 2024**

### Background

On October 17, 2024, golden mussel, an invasive, freshwater bivalve native to rivers and creeks of China and Southeast Asia, was discovered in the Port of Stockton and soon after at additional sites in the Sacramento-San Joaquin Delta (Delta). The presence of the species poses a significant immediate threat to the ecological health of the Delta and all waters of the state, water conveyance systems, infrastructure, and water quality; its arrival in California is a state, national, and international concern, representing the first confirmed detection in North America. Immediate steps are necessary to stop the spread of golden mussel to prevent the translocation of this non-native, invasive species to other waterbodies in the state and beyond.

Golden mussels can tolerate a wider range of environmental conditions than the invasive quagga and zebra (dreissenid) mussels, including less calcium requirements and higher tolerances for salinity and water temperatures. Nearly all waters of California are conducive to golden mussel establishment. Without containment, golden mussels are likely to spread overland on trailered vessels and equipment to other fresh and brackish waterbodies throughout California, to other ports and inland waters of North America, and potentially abroad.

As ecosystem engineers, golden mussels can permanently change ecosystem function. Where golden mussels establish, they create large encrustations of reef-like structures in a stream or river. The increase in organic matter shifts varied microhabitats and their diversity to monocultures of species, slowly eliminating aquatic species diversity. In waterways where golden mussels are present, heavy encrustations of golden mussels block municipal and industrial water intakes, requiring ongoing removal; harm native species in the ecosystem; facilitate aquatic weed growth; and diminish water quality. Spread of golden mussels out of the Delta into fresh and brackish waters would cause infrastructure damage across the state and could threaten water delivery and electric power delivery from hydroelectric operations.

The proposed emergency regulation will add golden mussel to the list of restricted animals, which will prohibit importation, transportation, and possession of live golden mussels. Adding golden mussels to the list will reduce the potential for people to introduce and move golden mussels to other waters of the state and prevent damage to native wildlife and their habitats, protect agricultural interests of the state, and protect public health and safety.

**Staff Summary for December 11-12, 2024**  
***For Background Purposes Only***

As required by Section 2118 of the California Fish and Game Code, the California Department of Food and Agriculture has been notified and concurs with the proposed action to add golden mussel to the list of restricted animals (Exhibit 7).

A notice of proposed emergency action was distributed December 4, 2024 in order to facilitate filing the rulemaking with the Office of Administrative Law as quickly as possible should the Commission adopt the regulation today. Other pertinent documents are available in exhibits 1 through 6 and Exhibit 8.

### **Significant Public Comments (N/A)**

### **Recommendation**

**Commission staff:** Find that an emergency exists, find that the project is exempt from the California Environmental Quality Act, and adopt the proposed emergency regulation adding golden mussel to the list of restricted animals as proposed in Exhibit 3 and discussed today.

**Department:** Adopt the regulation as proposed in Exhibit 3.

### **Exhibits**

1. Department memo transmitting draft emergency statement, received November 26, 2024
2. Draft emergency statement and informative digest
3. Draft proposed regulatory language
4. Draft economic and fiscal impact statement (STD. 399)
5. Department news release, dated October 31, 2024
6. Department presentation
7. California Department of Food and Agriculture concurrence email, dated November 14, 2024
8. Department memo and draft notice of exemption, received November 26, 2024

### **Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission finds, pursuant to Section 399 of the California Fish and Game Code, that adopting the proposed emergency regulation is necessary for the immediate conservation, preservation, and protection of birds, mammals, fish, amphibians, or reptiles, including, but not limited to, their nests or eggs and for the immediate preservation of the public peace, health and safety, or general welfare.

The Commission further determines that this project is exempt from the California Environmental Quality Act as an action necessary to protect a natural resource and the environment pursuant to the guidelines in California Code of Regulations, Title 14, sections 15307 and 15308.

The Commission further determines, pursuant to Section 11346.1 of the California Government Code, that an emergency situation exists and finds the proposed regulation is necessary to address the emergency.



**Staff Summary for December 11-12, 2024**  
***For Background Purposes Only***

Therefore, the Commission adopts the emergency regulation to amend Section 671, as discussed today.

**Staff Summary for April 16-17, 2025**  
**For Background Purposes Only**

## 6. Golden Mussel Emergency Regulation

### Today's Item

Information ☐

Action ☒

Consider a 90-day extension of the emergency regulation adding golden mussel (*Limnoperna fortunei*) to the list of animals restricted from live importation, transportation and possession.

### Summary of Previous/Future Actions

- Adoption hearing for emergency regulations to add golden mussel to the list of restricted animals December 11-12, 2024
- **Today consider adopting a 90-day extension of emergency regulations to retain golden mussel on the list of restricted animals** **April 16-17, 2025**

### Background

On October 17, 2024, golden mussel, an invasive, freshwater bivalve native to rivers and creeks of China and Southeast Asia, was discovered in the Port of Stockton and soon after at additional sites in the Sacramento-San Joaquin Delta (Delta). The presence of the species poses a significant immediate threat to the ecological health of the Delta and all waters of the state, water conveyance systems, infrastructure, and water quality; its arrival in California is a state, national, and international concern, representing the first confirmed detection in North America. Immediate steps are necessary to stop the spread of golden mussel to prevent the translocation of this non-native, invasive species to other waterbodies in the state and beyond. See Exhibit 1 for additional background information.

On December 12, 2024, the Commission took emergency action to add golden mussel to the list of animals restricted for importation, transportation and possession. The emergency regulation went into effect December 19, 2024 and will expire on June 18, 2025 unless readopted.

Today, the Commission will consider readopting the emergency regulation to retain golden mussel on the list of restricted animals for an additional 90 days, which will reduce the potential for people to introduce and move golden mussels to other waters of the state and prevent damage to native wildlife and their habitats, protect agricultural interests of the state, and protect public health and safety.

As of March 31, 2025, golden mussels have been detected 43 times (see exhibits 6 and 7). Several of the detections occurred after the draft finding of emergency and statement of proposed emergency regulatory action (emergency statement, exhibit 3) was prepared. If the Commission takes action today to extend the emergency regulation, staff will provide an updated list of detections in the emergency statement before filing the rulemaking with the Office of Administrative Law.

### Significant Public Comments

1. A fishing guide requests that the Commission support and encourage a standardized, transferable decontamination system that allows boaters to access all lakes after

## Staff Summary for April 16-17, 2025

### *For Background Purposes Only*

completing a one-time certification—provided they have not visited the Delta—to ensure that only those who have been in the Delta undergo additional decontamination, while preserving access for responsible boaters who pose no risk of contamination. (Exhibit 8)

## Recommendation

**Commission staff:** Find, pursuant to Section 399 of the Fish and Game Code, that adopting the proposed emergency regulation is necessary for the immediate conservation, preservation, and protection of birds, mammals, fish, amphibians, or reptiles, including, but not limited to, their nests or eggs and for the immediate preservation of the public peace, health and safety, or general welfare. Further determine, pursuant to Section 11346.1 of the Government Code, that an emergency situation exists and find the proposed regulation is necessary to address the emergency. Adopt a 90-day extension of the emergency regulation to amend Section 671, as recommended by the Department and authorize staff to update the emergency statement with the most current list of detections prior to filing the rulemaking with the Office of Administrative Law.

**Department:** Adopt a 90-day extension of the emergency regulation to amend Section 671 as proposed in Exhibit 4.

## Exhibits

1. Staff summary from the December 11-12, 2024 meeting, Agenda Item 16 (*for background purposes only*)
2. Department memo, received March 26, 2025
3. Draft emergency statement, dated February 24, 2025
4. Proposed regulatory language for readoption
5. Draft economic and fiscal impact statement (STD 399) and addendum
6. List of detections of golden mussels through March 31, 2025
7. Map of detections of golden mussels through March 31, 2025
8. Email from Tom Mailey, Get the Net Guide Service, dated April 2, 2025

## Motion

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the staff recommendations for items 3 through 6 on the consent calendar.

# Memorandum

Received May 16, 2025  
Original on File

**Date:** May 14, 2025

**To:** Melissa Miller-Henson  
Executive Director  
Fish and Game Commission

**From:** Charlton H. Bonham  
Director

**Subject:** **Item for June 11-12, 2025 Fish and Game Commission Meeting: Submittal of Emergency Statement and Regulatory Documents for the Second Readoption of the Amendment of Section 671, Title 14, California Code of Regulations, Re: Golden Mussels**

Please find attached the Findings of Emergency and Statement of Proposed Emergency Regulatory Action to Amend Section 671, of Title 14, California Code of Regulations (CCR).

On October 17, 2024, golden mussel, an invasive, freshwater bivalve, was discovered in the Port of Stockton and soon after at additional sites in the Sacramento-San Joaquin Delta (Delta). The presence of the species poses a significant immediate threat to the ecological health of the Delta and all waters of the state, water conveyance systems, infrastructure, and water quality. Its arrival is a state, national, and international concern. Immediate steps are necessary to stop the spread of this invasive species to prevent the translocation of this species to other waterbodies in the state and beyond.

Readopting the emergency regulation for a second 90-day period to continue the addition of golden mussel to the list of restricted animals in Title 14, Section 671, prohibits importation, transportation, and possession of live golden mussels, thereby reducing the potential for people to move them to other waters of the state and preventing damage to native wildlife and their habitats, protecting agricultural interests of the state, and protecting public health and safety.

The Department requests submission of this emergency action to the Office of Administrative Law after consideration at the June meeting. If you have any questions or need additional information, please contact Jay Rowan, Chief, Fisheries Branch at [fisheries@wildlife.ca.gov](mailto:fisheries@wildlife.ca.gov). The Department point of contact for this emergency regulation is Environmental Program Manager, Martha Volkoff. She can be reached at [Invasives@wildlife.ca.gov](mailto:Invasives@wildlife.ca.gov).

ec: Chad Dibble, Deputy Director  
Wildlife and Fisheries Division

Melissa Miller-Henson, Executive Director  
Fish and Game Commission  
May 14, 2025  
Page 2

Jay Rowan, Branch Chief  
Fisheries Branch  
Wildlife and Fisheries Division

Martha Volkoff, Env. Program Manager  
Fisheries Branch  
Wildlife and Fisheries Division

Robert Pelzman, Assistant Chief  
Law Enforcement Division

Megan Cisneros, Lieutenant  
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Dixie Van Allen, Program Manager  
Fish and Game Commission

Sherrie Fonbuena, Analyst  
Fish and Game Commission

State of California  
Fish and Game Commission  
Finding of Emergency and Statement of Proposed Emergency Regulatory Action

Second Readoption of Emergency Action to Amend Section 671  
Title 14, California Code of Regulations  
Re: Golden Mussel Emergency

Date of Statement: April 28, 2025

Throughout this document, CDFW refers to the California Department of Fish and Wildlife, and Commission refers to the California Fish and Game Commission. Unless otherwise specified, all section references in this document are to Title 14 of the California Code of Regulations (CCR).

## **I. Emergency Regulation in Effect to Date**

At its December 11, 2024 meeting, the Commission approved an emergency rulemaking to add golden mussel (*Limnoperna fortunei*) to the list of restricted animals in Section 671 (Office of Administrative Law File Number 2024-1213-03E). At its April 16, 2025 meeting, the Commission approved a first readoption for 90 days of the emergency regulations with no changes to the original emergency regulation text.

### **Background**

On October 17, 2024, golden mussel, an invasive, freshwater bivalve native to rivers and creeks of China and Southeast Asia, was discovered in the Port of Stockton by California Department of Water Resources (DWR) staff while conducting routine operations. This was the first known occurrence of this highly invasive species in North America. Shortly after, golden mussels were detected at additional sites in the Sacramento-San Joaquin Delta (Delta). The presence of the species poses a significant immediate threat to the ecological health of the Delta and all waters of the state, water conveyance systems, infrastructure, and water quality; its arrival in California is a state, national, and international concern. Without actions to prevent further spread, golden mussel is also likely to spread overland on trailered watercraft and equipment out of the Delta and to nearby and distant fresh and brackish waters, including rivers, lakes, and reservoirs within California and the rest of North America.

Golden mussel is known to be established outside of its native range in Hong Kong, Japan, Taiwan, Brazil, Uruguay, Paraguay, and Argentina. The initial introductions to these countries were likely the result of ships with biofouling on the hulls and/or ballast water release. Impacts in these invaded regions include heavy encrustations of golden mussels forming dense reef-like structures that block municipal and industrial water supplies, agricultural irrigation, and power plant operations, necessitating ongoing biofouling removal. In most cases, the invaded range has expanded upstream from the point of introduction, and inland from ports through local, human-mediated pathways. Within the invaded range, significant impacts resulting from the dense colonization of golden mussels on hard surfaces are widely documented.

Golden mussel has a similar appearance, biology, and impact as quagga and zebra (dreissenid) mussels. Golden mussels are small, typically under 1.5 inches in length, with shell color that is light golden to darker yellowish-brown to brown color. They firmly attach to hard to semi-hard

surfaces. Adult golden mussels release eggs and sperm into the water column where fertilization occurs. Fertilized eggs develop into planktonic larvae that remain suspended in the water column as they develop. Larvae are microscopic and by themselves cannot swim upstream but can be carried by flowing water and human-mediated pathways, such as water within watercraft. Once a suitable substrate is found, juvenile mussels settle and attach themselves to the substrate by strong fibers called byssal threads and develop into adults. Golden mussels can grow in dense colonies of hundreds of thousands of mussels per square meter.

Golden mussel can tolerate a wider range of environmental conditions than the invasive dreissenid mussels, including less calcium, higher salinity, and warmer water temperatures. Nearly all waters of California are conducive to golden mussel establishment.

Golden mussels were likely introduced to the Port of Stockton, San Joaquin County, by a ship traveling from an international port. Golden mussel is likely to spread throughout the interconnected Delta, upstream into Delta tributaries, as far west as Suisun Bay, and southward via the State Water Project and Central Valley Project that draw water from the Delta. Additional discoveries of golden mussel have occurred throughout the Delta and interconnected waters, including the lower reach of the San Joaquin River (San Joaquin County), and at several points in the California Aqueduct including, from north-to-south, Bethany Reservoir (Alameda County), O'Neill Forebay (Merced County), Dos Amigos Pumping Plant (Merced County), Pleasant Valley Pumping Plant (Fresno County), Las Perillas Pumping Plant on the Coastal Branch Aqueduct (King County), and Check 24 (King County).

Without containment, golden mussel is likely to spread overland on trailered vessels and equipment to other fresh and brackish waterbodies throughout California, and to other ports and inland waters of North America, and potentially abroad.

In response to the discovery of golden mussel, CDFW, in partnership with other agencies working in the Delta, began delineating the range of golden mussel in the Delta and throughout the state (Figure 1). Shortly thereafter, CDFW executive leadership convened an interagency Golden Mussel Task Force, comprised of a steering committee with members representing CDFW, DWR, State Parks-Division of Boating and Waterways, State Water Resources Control Board, California State Lands Commission, California Department of Food and Agriculture, US Bureau of Reclamation, and US Fish and Wildlife Service. The task force also formed eight task-oriented teams of staff from these same agencies, and others, to implement immediate monitoring and outreach efforts, and develop and inform the content of a response framework.

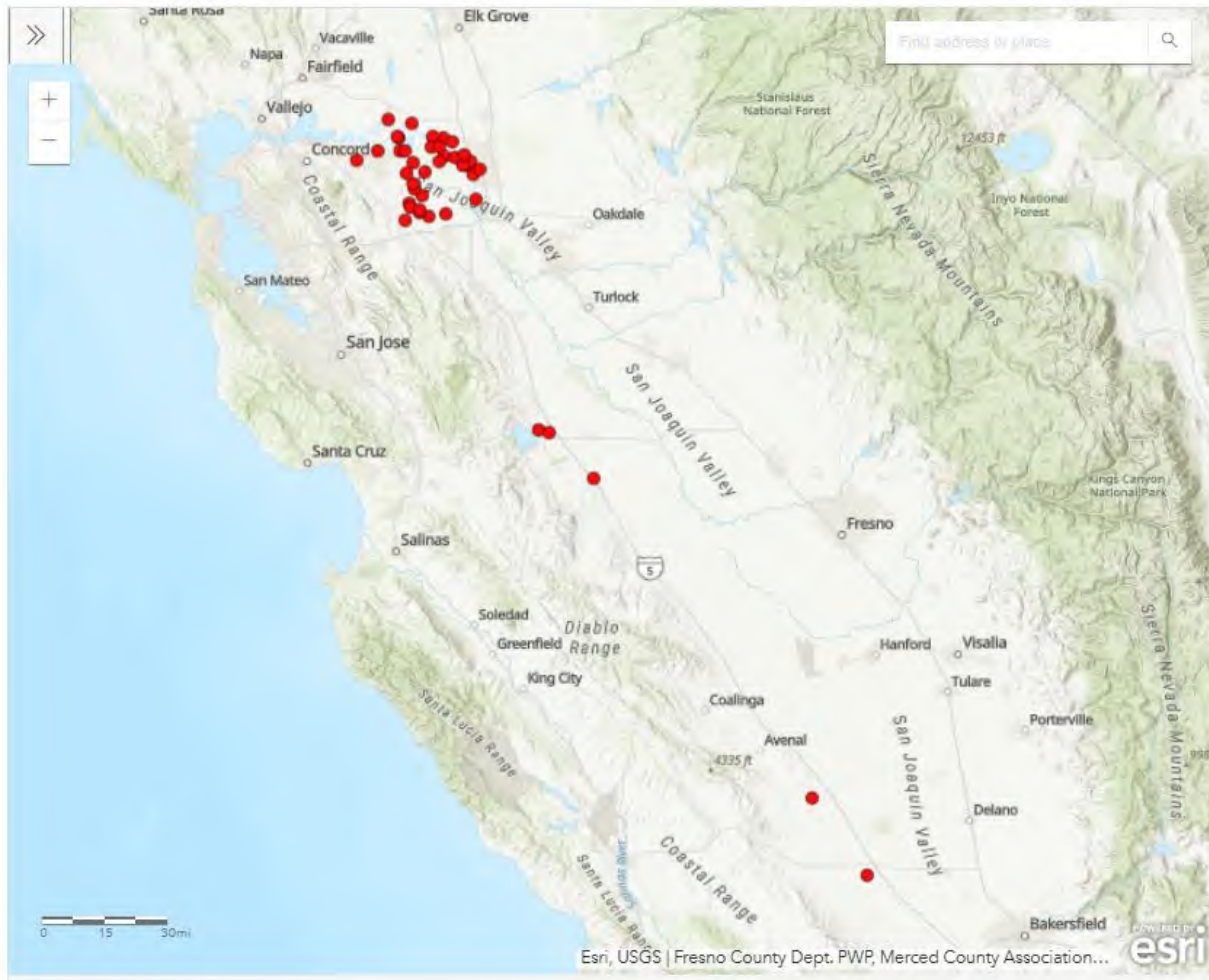
On April 16, 2025, the Golden Mussel Task Force announced the completion of the Golden Mussel Response Framework (State of California, 2025). The Response Framework provides the state and partners with a coordinated strategy for moving forward. The scope of recommendations includes containment within waters where golden mussels have been detected, prevention at uninfested waters, evaluation of existing authorities and gaps, existing funding opportunities and needs, and an approach to partner and public engagement.

In addition, CDFW announced a one-time \$1 million grant funding opportunity for nonprofit organizations, public agencies, and Tribal governments that own or operate boating facilities. The intention of the grant is to support one-time start-up costs for efforts to prevent the overland spread of invasive mussels from waters where they have been detected and prevent the introduction of invasive mussels to waters of California where they have not been detected.



Currently, there are no federal prohibitions for possessing or moving golden mussels. It is unlikely that any person is intentionally in possession of golden mussel, as they are not known to be a species for human consumption, for aquaculture or in the aquarium trade. In the event someone were to be in possession, intentionally or unintentionally, those mussels should be euthanized based on the currently effective emergency regulation. Pursuant to Section 671.1, golden mussels could be possessed under a permit issued by CDFW for purposes as defined in the regulations, or other existing CDFW permitting processes.

Figure 1. Golden mussel detections as of April 28, 2025 (map updated at <https://wildlife.ca.gov/Conservation/Invasives/Species/Golden-Mussel#map>).



## II. Request for Approval of Readoption of Emergency Regulations

At its December 11, 2024 meeting, the Commission approved an emergency action that added golden mussel to the list of restricted animals. At its April 16, 2025 meeting, the Commission readopted the emergency regulations for an additional 90-day period.

The emergency rule will expire September 16, 2025, unless it is readopted for a second additional 90-day period. The continuation of the emergency action of adding golden mussel to the list of restricted animals is necessary to protect against the spread in California's waterways of this non-



native, invasive species, which causes harm to native species and the ecosystems they depend on to survive, until a permanent regulation can be implemented.

It is anticipated that a standard rulemaking to permanently adopt these changes will be received by the Commission at its August 13-14, 2025 meeting, at which time the Commission is expected to authorize publication of a notice of its intent to adopt the regulations. It is expected that the permanent regulations will become effective in December 2025.

### **III. Statement of Facts Constituting the Need for Readoption of the Emergency Regulatory Action**

In response to the emergency situation, the proposed regulatory action readopts the amendment of Section 671 to add golden mussel to the list of restricted animals. The proposed regulation for readoption is the same as the original emergency regulation and the first 90-day readoption.

The emergency action added the golden mussel (*Limnoperna fortunei*) species in new subsection 671(c)(10)(B). A second readoption of the addition of golden mussel to the list of restricted animals will continue the prohibition of importation, transportation, and possession of live golden mussels, thereby deterring people from moving them to other waters of the state and providing enforceability if golden mussels are found in someone's possession.

The second readoption will also indirectly continue to allow water managers operating mussel prevention programs grounds to refuse watercraft that are or suspected to be carrying golden mussels from launching into waterways, and law enforcement personnel to inspect watercraft and quarantine any vessels that are infested with golden mussels and/or detain vessels or equipment until such time as they no longer pose a threat to the environment. California Fish and Game Code sections 2118 and 2120 provide broad authority for the restricted species list implemented in Section 671. Cooperation with the California Department of Food and Agriculture is required for consideration of the addition or removal of classes, families, genera, and species from the list of restricted species (subdivisions 2118(j) and (k)). Given the ramifications for spread of golden mussel, its presence is considered, "...undesirable, and a menace to native wildlife or the agricultural interests of the state."

### **IV. Existence of an Emergency and Need for Action**

The Commission considered the following factors in determining that an emergency continues at this time.

#### ***The magnitude of potential harm:***

In waterways where golden mussels are present, heavy encrustations of golden mussels have blocked municipal and industrial water intakes compelling ongoing biofouling removal (Xu et al. 2015; Zhao et al. 2019), harmed native species in the ecosystem (Boltovskoy and Correa 2015; Cataldo et al. 2012), facilitated aquatic weed growth, and diminished water quality (Zhang et al. 2022). Spread of golden mussel out of the Delta into fresh and brackish waters will cause infrastructural damage across the state and could threaten water delivery and electric power delivery from hydroelectric operations (for example, O'Neill Forebay). As an ecosystem engineer, golden mussel can permanently change ecosystem function. As large encrustations of reef-like structures grow in a stream or river, the increase in organic matter shifts varied microhabitats and

their diversity to monocultures of species, slowly eliminating aquatic species diversity (Mouthino, 2021).

Given the very real harms presented by golden mussels, individuals within and entering California should not be importing, transporting, or possessing them, therefore, it is appropriate to maintain its restricted species status.

***The existence of a crisis situation:***

The October 2024 discoveries in the Delta are the first known occurrences of golden mussels in North America. The presence of the species poses a significant immediate threat to the state's environment, ecological health of the Delta and all waters of the state, water conveyance systems, infrastructure, electric power delivery from hydroelectric operations, and water quality.

Because of rapid golden mussel colonization of infrastructure and water conveyances, this new invasion is a significant threat to the Delta and waterbodies statewide, nationally, and internationally. Impacts are far-reaching, from water transfers inclusive of the Central Valley Project and State Water Project, to water agencies and distributors, to recreationists. Adverse impacts could be felt to recreation, transportation and shipping, agriculture, and municipal water supplies.

***The immediacy of the need:***

There is a significant immediate need to continue limiting the spread of this invasive species to prevent the translocation of this species to other waterbodies in the state and beyond. There is an immediate need to conduct vessel inspections to reduce the spread of the aquatic invasive species. CDFW law enforcement needs to be able to inspect watercraft and quarantine any vessels that are infested with golden mussels. Water managers must be able to refuse vessels and equipment that are or suspected to be carrying golden mussels from launching into lakes, reservoirs, or other waterways where golden mussels are not known to be present.

Previous cases, such as in South America, have seen ultra-rapid expansion after the first infestation (e.g., Darrigran and Damborenea 2005), invading both natural areas and human infrastructure. Aside from natural mussel propagation, spread is assisted by human activities including commerce, fishing, and recreation. Any lapse in facilitating vessel inspections could allow the mussel's range to spread to new areas and compromise efforts to control it.

CDFW is continuing to work with state, local, and federal agencies to enhance monitoring efforts, communicate additional detection and response information, and coordinate on potential next steps. If the spread of this species is not prevented, more waterways will be infested, further increasing the threat to uninfested waters.

***Whether the anticipation of harm has a basis firmer than simple speculation:***

Ecosystem degradation, infrastructure biofouling, and water quality decreases are all documented potential effects from golden mussel invasion. Costs for maintenance, control, and surveillance have skyrocketed following its spread in other invaded areas (Darrigran and Damborenea 2005). Golden mussel is also quite adaptable to a broad range of environmental conditions; it tolerates a wide range of temperatures, salinity, and other water quality factors, making its spread to disparate areas much more likely even than other bivalve invaders.

California's experience with dreissenid mussels over the last 18 years has demonstrated prevention and containment are effective to slowing the spread of mussels and avoiding widespread impacts resulting from invasive mussel establishment. This success would not have been achieved without the necessary authority.

## **V. Readoption Criteria**

### ***Same as or Substantially Equivalent***

Pursuant to Government Code subdivision 11346.1(h), a readoption may be approved only if the regulation is "the same as or substantially equivalent to an emergency regulation previously adopted by that agency." The language proposed for this rulemaking is the same as the language of the original emergency regulation.

### ***Substantial Progress***

Government Code subdivision 11346.1(h) specifies "Readoption shall be permitted only if the agency has made substantial progress and proceeded with diligence to comply with subdivision (e)" [sections 11346.2 through 11347.3, inclusive].

A regular rulemaking (certificate of compliance) is currently underway and will be presented to the Commission for public notice at its August 13-14, 2025 meeting.

### ***Proposed Action by the Commission***

The Commission proposed readoption of the emergency amendment to Section 671 is the same as previously effective.

## **VI. Impact of Regulatory Action**

The potential for significant statewide adverse economic impacts that might result from the proposed regulatory action has been assessed, and the following initial determinations relative to the required statutory categories have been made:

### **(a) Costs or Savings to State Agencies or Costs/Savings in Federal Funding to the State:**

Continuing to include golden mussel on the list of restricted animals does not necessarily compel a requirement to act upon state agencies but rather enables existing programs to include the species in their enforcement actions for detection and prevention. As such, the Commission does not anticipate any direct costs or savings to CDFW or other state agencies as a result of this emergency action. There may be future complementary authorities or requirements for managing golden mussels that will come from elsewhere, such as legislation, compelling costs associated with preventing the spread of golden mussels.

### **(b) Nondiscretionary Costs/Savings to Local Agencies:**

None. Continuing to include golden mussel on the list of restricted animals will not have the potential for a fiscal effect on local governments, as the regulation only adds the species to the restricted animals list without prescribing specific enforcement actions to be taken by local government entities.

**(c) Programs Mandated on Local Agencies or School Districts:**

None. Continuing to include golden mussel on the list of restricted animals will not have the potential for a fiscal effect on local governments or school districts, as the regulation only adds the species to the restricted animals list without mandating specific enforcement actions or programs to be taken by local government entities.

**(d) Costs Imposed on Any Local Agency or School District that is Required to be Reimbursed Under Part 7 (commencing with Section 17500) of Division 4, Government Code: None.****(e) Effect on Housing Costs: None****VII. Technical, Theoretical, and/or Empirical Studies, Reports, or Documents Relied Upon:**

State of California. 2025. [Golden Mussel Response Framework](#). Available from: [Golden Mussel Response Framework](#). April 14, 2025

California Department of Fish and Game. 2008. [California Aquatic Invasive Species Management Plan](#); Draft Rapid Response Plan. State of California, Resources Agency. Available from: [California Aquatic Invasive Species Management Plan](#).

Smith, R. and L. McMartin. 2011. [Bay Delta Rapid Response Plan For Dreissenid Mussels](#). U.S. Fish and Wildlife Service developed for the California Department of Fish and Game #P0685514. Stockton, CA.

**VIII. Documents Providing Background Information**

Boltovskoy, D., E. Paolucci, H. J. MacIsaac, A. Zhan, Z. Xia, and N. Correa. 2022. What we know and don't know about the invasive golden mussel *Limnoperna fortunei*. Hydrobiologia. <https://doi.org/10.1007/s10750-022-04988-5>.

Boltovskoy, D., and N. Correa. 2015. Ecosystem impacts of the invasive bivalve *Limnoperna fortunei* (golden mussel) in South America. Hydrobiologia 746:81–95.

Cataldo, D., I. O' Farrell, E. Paolucci, F. Sylvester, and D. Boltovskoy. 2012. Impact of the invasive golden mussel (*Limnoperna fortunei*) on phytoplankton and nutrient cycling. Aquatic Invasions 7:91–100.

Darrigran, G. A., and M. C. Damborenea. 2005. A South American bioinvasion case history: *Limnoperna fortunei* (Dunker, 1857), the golden mussel. American Malacological Bulletin 20:105–112.

Moutinho, S. 2021. A Golden Menace. An invasive mussel is devastating ecosystems as it spreads through South American rivers, threatening the Amazon basin. Science 374: 390–393. Available from: <https://www.science.org/content/article/golden-mussels-devastating-south-american-rivers-amazon-may-be-next>.

Xu, M., Z. Wang, N. Zhao, and B. Pan. 2015. Growth, reproduction, and attachment of the golden mussel (*Limnoperna fortunei*) in water diversion projects. Acta Ecologica Sinica 35:70–75.

Zhang, J., M. Xu, L. Sun, D. Reible, and X. Fu. 2022. Impact of golden mussel (*Limnoperna fortunei*) colonization on bacterial communities and potential risk to water quality. *Ecological Indicators* 144:109499.

Zhao, N., M. Xu, K. Blanckaert, C. Qiao, H. Zhou, and X. Niu. 2019. Study of factors influencing the invasion of Golden Mussels (*Limnoperna fortunei*) in water transfer projects. *Aquatic Ecosystem Health & Management* 22:385–395.

## **IX. Authority and Reference**

Authority: Sections 2118 and 2120, Fish and Game Code.

Reference: Sections 1002, 2116, 2118, 2118.2, 2118.4, 2119, 2120, 2122, 2123, 2124, 2125, 2126, 2127, 2150, 2190 and 2271, Fish and Game Code.

## **X. Fish and Game Code Section 399 Finding**

Pursuant to Section 399 of the Fish and Game Code, the Commission finds that the readoption of this regulation is necessary for the immediate preservation of the public peace, health and safety, or general welfare.

## Informative Digest/Policy Statement Overview

Throughout this document, CDFW refers to the California Department of Fish and Wildlife, and Commission refers to the California Fish and Game Commission. Unless otherwise specified, all section references in this document are to Title 14 of the California Code of Regulations (CCR).

On October 17, 2024, golden mussel (*Limnoperna fortunei*), an invasive, non-native, freshwater bivalve native to rivers and creeks of China and Southeast Asia, was discovered in the Port of Stockton, San Joaquin County, by California Department of Water Resources (DWR) staff while conducting routine operations. This was the first known occurrence of this highly invasive species in North America. As of April 28, 2025, additional discoveries of golden mussel have occurred throughout the Delta and interconnected waters including the lower reach of the San Joaquin River (San Joaquin County), and at several points in the California Aqueduct including, from north-to-south, Bethany Reservoir (Alameda County), O'Neill Forebay (Merced County), Dos Amigos Pumping Plant (Merced County), Pleasant Valley Pumping Plant (Fresno County), Las Perillas Pumping Plant on the Coastal Branch Aqueduct (King County), and Check 24 (King County).

Golden mussels were likely introduced to the Port of Stockton, San Joaquin County, by a ship traveling from an international port. Golden mussel is likely to spread throughout the interconnected Delta, upstream into Delta tributaries, as far west as Suisun Bay, and southward via the State Water Project and Central Valley Project that draw water from the Delta. Without containment, golden mussel is likely to spread overland on trailered vessels and equipment to other fresh and brackish waterbodies throughout California, and to other ports and inland waters of North America, and potentially abroad.

Golden mussel is known to be established outside of its native range in Hong Kong, Japan, Taiwan, Brazil, Uruguay, Paraguay, and Argentina. Within the invaded range, significant impacts resulting from the dense colonization of golden mussels on hard surfaces are widely documented.

The presence of golden mussel poses a significant immediate threat to the ecological health of the Delta and all waters of the state, the operations of water conveyance systems, agricultural interests, hydroelectric power generation, infrastructure, water quality, and the economy. Its presence in California is of statewide, national, and international concern.

Golden mussel has a similar appearance, biology, and impact as quagga and zebra (dreissenid) mussels. Golden mussel can tolerate a wider range of environmental conditions than dreissenid mussels, including less calcium, higher salinity, and warmer water temperatures. Nearly all waters of California are conducive to golden mussel establishment.

Golden mussel is an ecosystem engineer and can profoundly change natural environments. It threatens California's infrastructure, recreation, municipal and industrial water supplies, the robust agricultural industry, and power plant operations. Millions of dollars are already spent annually to maintain infrastructure and prevent further spread of dreissenid mussels in California, and golden mussel are anticipated to increase these costs significantly.

Golden mussel can also impact recreation by limiting recreational opportunities, encrusting docks and beaches, and colonizing recreational equipment including watercraft hulls, engines, and steering components. Dreissenid mussel infestations resulted in the temporary and permanent closure of waterbodies to the public and have negatively impacted aquatic ecosystems.



CDFW and partners have been mobilizing a statewide response, including delineation of the infestation and implementing containment to prevent the further spread of golden mussel. Currently there are no federal prohibitions for possessing or moving golden mussels. Other than the currently effective emergency regulation, there are no other state prohibitions for possessing or moving golden mussels. Re-adopting the emergency regulations for golden mussel to remain on the list of restricted animals in Section 671 will continue to equip CDFW and local water managers with authority to take action to prevent the overland spread of golden mussels.

In response to the emergency situation, the proposed regulatory action readopts the amendment of Section 671 adding the golden mussel species to the list of restricted animals in new subsection 671(c)(10)(B). The proposed regulation for readoption is the same as the original emergency as well as the first 90-day readoption.

Continuing to include golden mussel on the list of restricted animals will keep in place the prohibition on importation, transportation, and possession of live golden mussels, thereby deterring people from moving them to other waters of the state and providing enforceability if golden mussels are found in someone's possession. Continuing to include golden mussel on the list of restricted animals will also allow water managers operating mussel prevention programs grounds to refuse vessels and equipment that are or suspected to be carrying golden mussels from launching into lakes, reservoirs, or other waterways where golden mussels are not known to be present. Additionally, it will allow law enforcement personnel to inspect watercraft and quarantine any vessels that are infested with golden mussels and/or detain vessels or equipment until such time as they no longer pose a threat to the environment.

### ***Benefits of the Regulation:***

The California Legislature has declared that some wild animals are a threat to native wildlife or the agricultural interests of the state and that some wild animals are a threat to public health and safety. It is the Legislature's intention that the importation, transportation and possession of wild animals be regulated to protect the native wildlife and agricultural interests of the state against damage from the existence at large of certain wild animals and to protect the health and safety in this state. The proposed regulations will help to prevent the translocation of golden mussel to other waterbodies in the state and beyond, thereby protecting native wildlife, the agricultural interests of the state and public health and safety.

### ***Consistency and Compatibility with Existing Regulations***

Article IV, Section 20 of the State Constitution specifies that the Legislature may delegate to Commission such powers relating to the protection and propagation of fish and game as the Legislature sees fit. The Legislature has delegated to the Commission the power to regulate the importation, transportation and possession of wild animals to protect the native wildlife, agricultural interests of the state, and the health and safety in this state (Fish and Game Code Section 2118). The Commission has reviewed its own regulations and finds that the proposed regulations are consistent with other regulations in Title 14, CCR, and therefore finds that the proposed regulations are neither inconsistent nor incompatible with existing state regulations. The Commission has searched the California Code of Regulations and finds no other state agency regulations pertaining to adding golden mussel to the list of restricted animals.

## Proposed Regulatory Language for Readoption

Section 671, Title 14 CCR, is amended to read:

### § 671. Importation, Transportation and Possession of Live Restricted Animals.

(a) It shall be unlawful to import, transport, or possess live animals restricted in subsection (c) below except under permit issued by the department. Permits may be issued by the department as specified herein and for purposes designated in Section 671.1 subject to the conditions and restrictions designated by the department. Except for mammals listed in Fish and Game Code Section 3950 or live aquatic animals requiring a permit pursuant to Fish and Game Code Section 2271, no permit is required by this section for any animal being imported, transported, or possessed pursuant to any other permit issued by the department. Cities and counties may also prohibit possession or require a permit for these and other species not requiring a state permit.

(b) The commission has determined the below listed animals are not normally domesticated in this state. Mammals listed to prevent the depletion of wild populations and to provide for animal welfare are termed “welfare animals”, and are designated by the letter “W”. Those species listed because they pose a threat to native wildlife, the agriculture interests of the state or to public health or safety are termed “detrimental animals” and are designated by the letter “D”. The department shall include the list of welfare and detrimental wild animals as part of DFG MANUAL NO. 671 (2/25/92) IMPORTATION, TRANSPORTATION AND POSSESSION OF RESTRICTED SPECIES, to be made available to all permittees and other interested individuals.

(c) Restricted species include:

[...No changes to subsections (c)(1) through (c)(9)(D)1...]

(10) Class Bivalvia-Bivalves

~~All members of the genus *Dreissena* (zebra and quagga mussels) — (D).~~

(A) All members of the genus *Dreissena* (zebra and quagga mussels) (D).

(B) *Limnoperna fortunei* (golden mussel) (D)

(11) Transgenic Aquatic Animals.

Includes freshwater and marine fishes, invertebrates, amphibians, and reptiles (D).

NOTE: Unpermitted transgenic aquatic animals are determined to be detrimental to native wildlife, therefore the exemption provided for in Fish and Game Code Section 2150(e) is not applicable.

NOTE: Authority cited: Sections 2118 and 2120, Fish and Game Code.

Reference: Sections 1002, 2116, 2118, 2118.2, 2118.4, 2119, 2120, 2122, 2123, 2124, 2125, 2126, 2127, 2150, 2190 and 2271, Fish and Game Code.



**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

STD. 399 (Rev. 10/2019)

**ECONOMIC IMPACT STATEMENT**

DEPARTMENT NAME California Fish and Game Commission	CONTACT PERSON David Thesell	EMAIL ADDRESS fgc@fgc.ca.gov	TELEPHONE NUMBER 916 201-6201
DESCRIPTIVE TITLE FROM NOTICE REGISTER OR FORM 400 2nd Readopt Emerg. Action to Amend Sec 671, Title 14, CCR, Re: Add Golden Mussel to List of Rstd. Animals			NOTICE FILE NUMBER Z

**A. ESTIMATED PRIVATE SECTOR COST IMPACTS** *Include calculations and assumptions in the rulemaking record.*

1. Check the appropriate box(es) below to indicate whether this regulation:

- |  |   |
|--|---|
| <input type="checkbox"/> a. Impacts business and/or employees  | <input type="checkbox"/> e. Imposes reporting requirements                |
| <input type="checkbox"/> b. Impacts small businesses           | <input type="checkbox"/> f. Imposes prescriptive instead of performance   |
| <input type="checkbox"/> c. Impacts jobs or occupations        | <input type="checkbox"/> g. Impacts individuals                           |
| <input type="checkbox"/> d. Impacts California competitiveness | <input checked="" type="checkbox"/> h. None of the above (Explain below): |

Emergency action: No economic assessment is required, only a fiscal impact

***If any box in Items 1 a through g is checked, complete this Economic Impact Statement.******If box in Item 1.h. is checked, complete the Fiscal Impact Statement as appropriate.***2. The \_\_\_\_\_ estimates that the economic impact of this regulation (which includes the fiscal impact) is:  
(Agency/Department)

- ☐ Below \$10 million
- ☐ Between \$10 and \$25 million
- ☐ Between \$25 and \$50 million
- ☐ Over \$50 million *[If the economic impact is over \$50 million, agencies are required to submit a Standardized Regulatory Impact Assessment as specified in Government Code Section 11346.3(c)]*

3. Enter the total number of businesses impacted: \_\_\_\_\_

Describe the types of businesses (Include nonprofits): \_\_\_\_\_

Enter the number or percentage of total  
businesses impacted that are small businesses: \_\_\_\_\_

4. Enter the number of businesses that will be created: \_\_\_\_\_ eliminated: \_\_\_\_\_

Explain: \_\_\_\_\_

5. Indicate the geographic extent of impacts: ☐ Statewide  
☐ Local or regional (List areas): \_\_\_\_\_

6. Enter the number of jobs created: \_\_\_\_\_ and eliminated: \_\_\_\_\_

Describe the types of jobs or occupations impacted: \_\_\_\_\_

7. Will the regulation affect the ability of California businesses to compete with  
other states by making it more costly to produce goods or services here? ☐ YES ☐ NO

If YES, explain briefly: \_\_\_\_\_

**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

STD. 399 (Rev. 10/2019)

**ECONOMIC IMPACT STATEMENT (CONTINUED)****B. ESTIMATED COSTS** *Include calculations and assumptions in the rulemaking record.*

1. What are the total statewide dollar costs that businesses and individuals may incur to comply with this regulation over its lifetime? \$ \_\_\_\_\_

a. Initial costs for a small business: \$ \_\_\_\_\_ Annual ongoing costs: \$ \_\_\_\_\_ Years: \_\_\_\_\_

b. Initial costs for a typical business: \$ \_\_\_\_\_ Annual ongoing costs: \$ \_\_\_\_\_ Years: \_\_\_\_\_

c. Initial costs for an individual: \$ \_\_\_\_\_ Annual ongoing costs: \$ \_\_\_\_\_ Years: \_\_\_\_\_

d. Describe other economic costs that may occur: \_\_\_\_\_

2. If multiple industries are impacted, enter the share of total costs for each industry: \_\_\_\_\_

3. If the regulation imposes reporting requirements, enter the annual costs a typical business may incur to comply with these requirements.  
*Include the dollar costs to do programming, record keeping, reporting, and other paperwork, whether or not the paperwork must be submitted.* \$ \_\_\_\_\_4. Will this regulation directly impact housing costs? ☐ YES ☐ NO

If YES, enter the annual dollar cost per housing unit: \$ \_\_\_\_\_

Number of units: \_\_\_\_\_

5. Are there comparable Federal regulations? ☐ YES ☐ NO

Explain the need for State regulation given the existence or absence of Federal regulations: \_\_\_\_\_

Enter any additional costs to businesses and/or individuals that may be due to State - Federal differences: \$ \_\_\_\_\_

**C. ESTIMATED BENEFITS** *Estimation of the dollar value of benefits is not specifically required by rulemaking law, but encouraged.*

1. Briefly summarize the benefits of the regulation, which may include among others, the health and welfare of California residents, worker safety and the State's environment: \_\_\_\_\_

2. Are the benefits the result of: ☐ specific statutory requirements, or ☐ goals developed by the agency based on broad statutory authority?

Explain: \_\_\_\_\_

3. What are the total statewide benefits from this regulation over its lifetime? \$ \_\_\_\_\_

4. Briefly describe any expansion of businesses currently doing business within the State of California that would result from this regulation: \_\_\_\_\_

**D. ALTERNATIVES TO THE REGULATION** *Include calculations and assumptions in the rulemaking record. Estimation of the dollar value of benefits is not specifically required by rulemaking law, but encouraged.*

1. List alternatives considered and describe them below. If no alternatives were considered, explain why not: \_\_\_\_\_

**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

STD. 399 (Rev. 10/2019)

Draft Document

**ECONOMIC IMPACT STATEMENT (CONTINUED)**

2. Summarize the total statewide costs and benefits from this regulation and each alternative considered:

Regulation: Benefit: \$ \_\_\_\_\_ Cost: \$ \_\_\_\_\_

Alternative 1: Benefit: \$ \_\_\_\_\_ Cost: \$ \_\_\_\_\_

Alternative 2: Benefit: \$ \_\_\_\_\_ Cost: \$ \_\_\_\_\_

3. Briefly discuss any quantification issues that are relevant to a comparison of estimated costs and benefits for this regulation or alternatives: \_\_\_\_\_  
\_\_\_\_\_4. Rulemaking law requires agencies to consider performance standards as an alternative, if a regulation mandates the use of specific technologies or equipment, or prescribes specific actions or procedures. Were performance standards considered to lower compliance costs? ☐ YES ☐ NOExplain: \_\_\_\_\_  
\_\_\_\_\_**E. MAJOR REGULATIONS** *Include calculations and assumptions in the rulemaking record.****California Environmental Protection Agency (Cal/EPA) boards, offices and departments are required to submit the following (per Health and Safety Code section 57005). Otherwise, skip to E4.***1. Will the estimated costs of this regulation to California business enterprises **exceed \$10 million**? ☐ YES ☐ NO***If YES, complete E2. and E3******If NO, skip to E4***

2. Briefly describe each alternative, or combination of alternatives, for which a cost-effectiveness analysis was performed:

Alternative 1: \_\_\_\_\_

Alternative 2: \_\_\_\_\_

*(Attach additional pages for other alternatives)*

3. For the regulation, and each alternative just described, enter the estimated total cost and overall cost-effectiveness ratio:

Regulation: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

Alternative 1: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

Alternative 2: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

4. Will the regulation subject to OAL review have an estimated economic impact to business enterprises and individuals located in or doing business in California exceeding \$50 million in any 12-month period between the date the major regulation is estimated to be filed with the Secretary of State through 12 months after the major regulation is estimated to be fully implemented?

☐ YES ☐ NO*If YES, agencies are required to submit a Standardized Regulatory Impact Assessment (SRIA) as specified in Government Code Section 11346.3(c) and to include the SRIA in the Initial Statement of Reasons.*

5. Briefly describe the following:

The increase or decrease of investment in the State: \_\_\_\_\_  
\_\_\_\_\_The incentive for innovation in products, materials or processes: \_\_\_\_\_  
\_\_\_\_\_The benefits of the regulations, including, but not limited to, benefits to the health, safety, and welfare of California residents, worker safety, and the state's environment and quality of life, among any other benefits identified by the agency: \_\_\_\_\_  
\_\_\_\_\_

**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

STD. 399 (Rev. 10/2019)

**Draft Document****FISCAL IMPACT STATEMENT****A. FISCAL EFFECT ON LOCAL GOVERNMENT** *Indicate appropriate boxes 1 through 6 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*

- ☐ 1. Additional expenditures in the current State Fiscal Year which are reimbursable by the State. (Approximate)  
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

\$ \_\_\_\_\_

- ☐ a. Funding provided in \_\_\_\_\_  
Budget Act of \_\_\_\_\_ or Chapter \_\_\_\_\_, Statutes of \_\_\_\_\_

- ☐ b. Funding will be requested in the Governor's Budget Act of \_\_\_\_\_  
Fiscal Year: \_\_\_\_\_

- ☐ 2. Additional expenditures in the current State Fiscal Year which are NOT reimbursable by the State. (Approximate)  
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

\$ \_\_\_\_\_

*Check reason(s) this regulation is not reimbursable and provide the appropriate information:*

- ☐ a. Implements the Federal mandate contained in \_\_\_\_\_
- ☐ b. Implements the court mandate set forth by the \_\_\_\_\_ Court.

Case of: \_\_\_\_\_ vs. \_\_\_\_\_

- ☐ c. Implements a mandate of the people of this State expressed in their approval of Proposition No. \_\_\_\_\_

Date of Election: \_\_\_\_\_

- ☐ d. Issued only in response to a specific request from affected local entity(s).

Local entity(s) affected: \_\_\_\_\_  
\_\_\_\_\_

- ☐ e. Will be fully financed from the fees, revenue, etc. from: \_\_\_\_\_

Authorized by Section: \_\_\_\_\_ of the \_\_\_\_\_ Code;

- ☐ f. Provides for savings to each affected unit of local government which will, at a minimum, offset any additional costs to each;

- ☐ g. Creates, eliminates, or changes the penalty for a new crime or infraction contained in \_\_\_\_\_

- ☐ 3. Annual Savings. (approximate)

\$ \_\_\_\_\_

- ☐ 4. No additional costs or savings. This regulation makes only technical, non-substantive or clarifying changes to current law regulations.

- ☒ 5. No fiscal impact exists. This regulation does not affect any local entity or program.

- ☐ 6. Other. Explain \_\_\_\_\_  
\_\_\_\_\_

**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

STD. 399 (Rev. 10/2019)

Draft Document

**FISCAL IMPACT STATEMENT (CONTINUED)****B. FISCAL EFFECT ON STATE GOVERNMENT** *Indicate appropriate boxes 1 through 4 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*☐ 1. Additional expenditures in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

*It is anticipated that State agencies will:*☐ a. Absorb these additional costs within their existing budgets and resources.☐ b. Increase the currently authorized budget level for the \_\_\_\_\_ Fiscal Year☐ 2. Savings in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

☒ 3. No fiscal impact exists. This regulation does not affect any State agency or program.☐ 4. Other. Explain \_\_\_\_\_  
\_\_\_\_\_**C. FISCAL EFFECT ON FEDERAL FUNDING OF STATE PROGRAMS** *Indicate appropriate boxes 1 through 4 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*☐ 1. Additional expenditures in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

☐ 2. Savings in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

☒ 3. No fiscal impact exists. This regulation does not affect any federally funded State agency or program.☐ 4. Other. Explain \_\_\_\_\_  
\_\_\_\_\_

FISCAL OFFICER SIGNATURE

DATE

*The signature attests that the agency has completed the STD. 399 according to the instructions in SAM sections 6601-6616, and understands the impacts of the proposed rulemaking. State boards, offices, or departments not under an Agency Secretary must have the form signed by the highest ranking official in the organization.*

AGENCY SECRETARY

DATE

*Finance approval and signature is required when SAM sections 6601-6616 require completion of Fiscal Impact Statement in the STD. 399.*

DEPARTMENT OF FINANCE PROGRAM BUDGET MANAGER

DATE



## STD 399 Addendum

### **Second Readoption of Emergency Action to Amend Section 671 Title 14, California Code of Regulations Re: Add Golden Mussel to List of Restricted Animals**

#### **Background**

On October 17, 2024, golden mussel, an invasive, non-native, freshwater bivalve native to rivers and creeks of China and Southeast Asia, was discovered in the Port of Stockton by California Department of Water Resources (DWR) staff while conducting routine operations. This was the first known occurrence of this highly invasive species in North America. Shortly after, golden mussels were detected at additional sites in the Sacramento-San Joaquin Delta (Delta).

Golden mussels pose a significant immediate threat to the ecological health of the Delta and all waters of the state, the operations of water conveyance systems, agricultural interests, hydroelectric power generation, infrastructure, water quality and the economy; its presence in California is of statewide, national, and international concern.

Golden mussel can tolerate a wider range of environmental conditions than dreissenid mussels, meaning they are able to establish in environments where dreissenid mussels are unable to invade. Because they require less calcium to survive and reproduce than dreissenid mussels, nearly every waterbody in California is at risk of becoming infested with golden mussels if they are introduced. Golden mussels tolerate higher salinity than dreissenid mussels, making the brackish parts of estuaries, such as Suisun Bay, suitable for golden mussel establishment. They also tolerate warmer temperatures compared to dreissenid mussels. Golden mussels can grow in dense colonies of hundreds of thousands of mussels per square meter.

Like dreissenid mussels, golden mussels pose an environmental threat to California since they are ecosystem engineers and can profoundly change the food web of an invaded ecosystem. They can impact native species and sports fish by competing for food sources. They can also increase water clarity due to intense filter feeding, resulting in degraded water quality, algal blooms, and increased aquatic vegetation growth that requires control to maintain navigation.

Like dreissenid mussels, golden mussels pose an economic threat to California's infrastructure and recreation industries. Heavy encrustations of golden mussels form dense reef-like structures that block municipal and industrial water supplies, agricultural irrigation, and power plant operations, necessitating ongoing biofouling removal. Millions of dollars are spent annually to maintain infrastructure and efforts to prevent the further spread of dreissenid mussels in California.

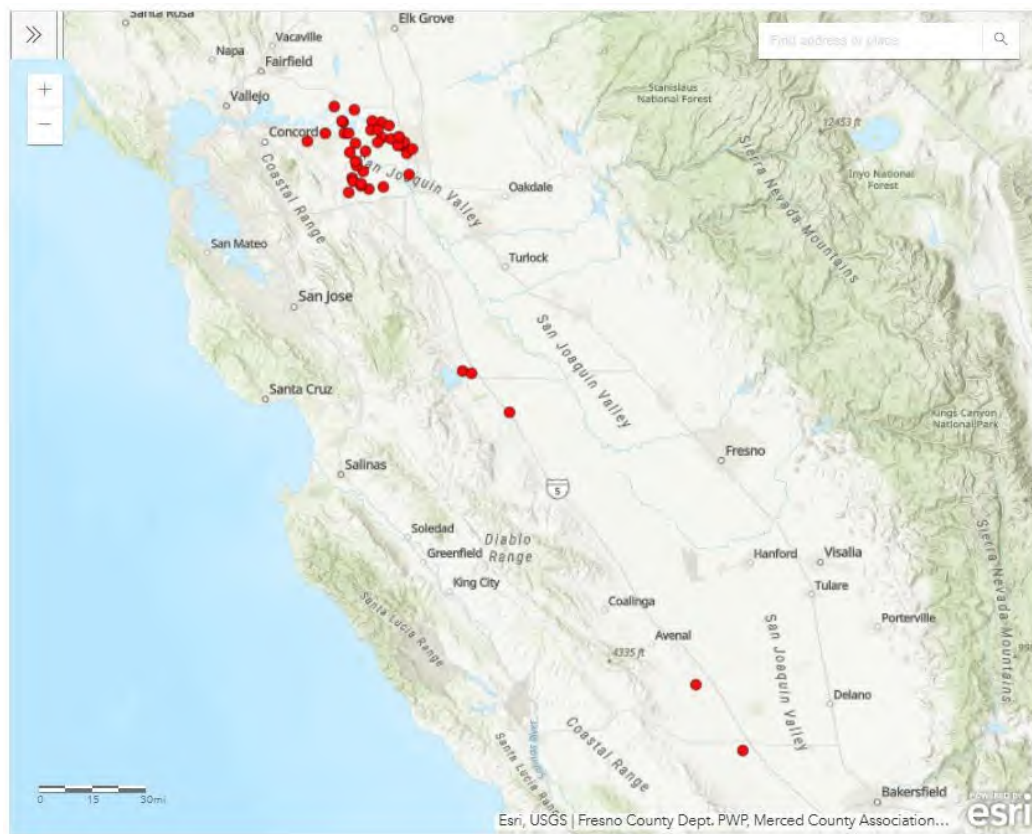
Golden mussels can also impact recreation by limiting recreational opportunities, encrusting docks and beaches, and colonizing recreational equipment including watercraft hulls, engines, and steering components. Dreissenid mussel infestations resulted in the

temporary and permanent closure of waterbodies to the public and have negatively impacted aquatic ecosystems.

Golden mussels were likely introduced to the Port of Stockton, San Joaquin County, by a ship traveling from an international port. Golden mussels are likely to spread throughout the interconnected Delta, upstream into Delta tributaries, as far west as the Suisun Bay, and southward via the State Water Project and Central Valley Project that draw water from the Delta. Without containment, golden mussels are also likely to spread overland on trailered vessels and equipment to other fresh and brackish waterbodies throughout California, and to other ports and inland waters of North America, and potentially abroad.

In response to the discovery of golden mussel, the California Department of Fish and Wildlife (CDFW), in partnership with other agencies working in the Delta, began delineating the range of golden mussel in the Delta and throughout the state (Figure 1). Shortly thereafter CDFW executive leadership convened a Golden Mussel Task Force, comprised of a steering committee with members representing CDFW, DWR, State Parks-Division of Boating and Waterways, State Water Resources Control Board, California State Lands Commission, California Department of Food and Agriculture, US Bureau of Reclamation, and US Fish and Wildlife Service. The task force also formed eight task-oriented teams of staff from these same agencies, and others, to implement immediate monitoring and outreach efforts, and develop and inform the content of a response plan.

Figure 1. Golden mussel detections as of April 28, 2025. Red circles refer to positive detections.





In response to this emergency situation, the proposed regulatory action readopts the amendment to Section 671 retaining golden mussel on the list of restricted animals. Including golden mussel on the list of restricted animals prohibits importation, transportation, and possession of live golden mussels, thereby deterring people from moving them to other waters of the state and providing enforceability if golden mussels are found in someone's possession. Including golden mussel on the list of restricted species also allows water managers operating mussel prevention programs the grounds to refuse watercraft from launching into waterways. Additionally, it allows law enforcement personnel to detain vessels or equipment infested with golden mussels until such time as they no longer pose a threat.

## **Economic Impact Statement**

### **Estimated Private Sector Cost Impacts**

1. Answer: h. None of the above.

Emergency regulations do not require an economic impact statement; only fiscal impacts must be evaluated (California Government Code Section 11346.1).

## **Fiscal Impact Statement**

### **A. Fiscal Effect on Local Government**

Answer: 5. No fiscal impact.

None. The proposed regulations to readopt for a second 90-day extension amendments to Section 671, Title 14, California Code of Regulations, to add golden mussel to the list of restricted animals will not have the potential for a fiscal effect on local governments, as the regulation only adds the species to the restricted animals list without prescribing specific enforcement actions to be taken by local government entities.

### **B. Fiscal Effect on State Government**

Answer: 3. No fiscal impact exists. This regulation does not affect any state agency or program.

Maintaining golden mussel on the restricted species list does not necessarily compel a requirement to act upon state agencies but rather enables existing programs to include the species in their enforcement actions for detection and prevention. As such, the Commission does not anticipate any direct costs or savings to CDFW or other state agencies as a result of this second 90-day readoption. There may be future complementary authorities or requirements for managing golden mussels that will come from elsewhere, such as legislation, compelling costs associated with preventing the spread of golden mussels.

### **C. Fiscal Effect on Federal Funding of State Programs**

Answer: 3. No fiscal impact.

The proposed readoption will not have the potential for a fiscal effect on the federal funding of state programs.



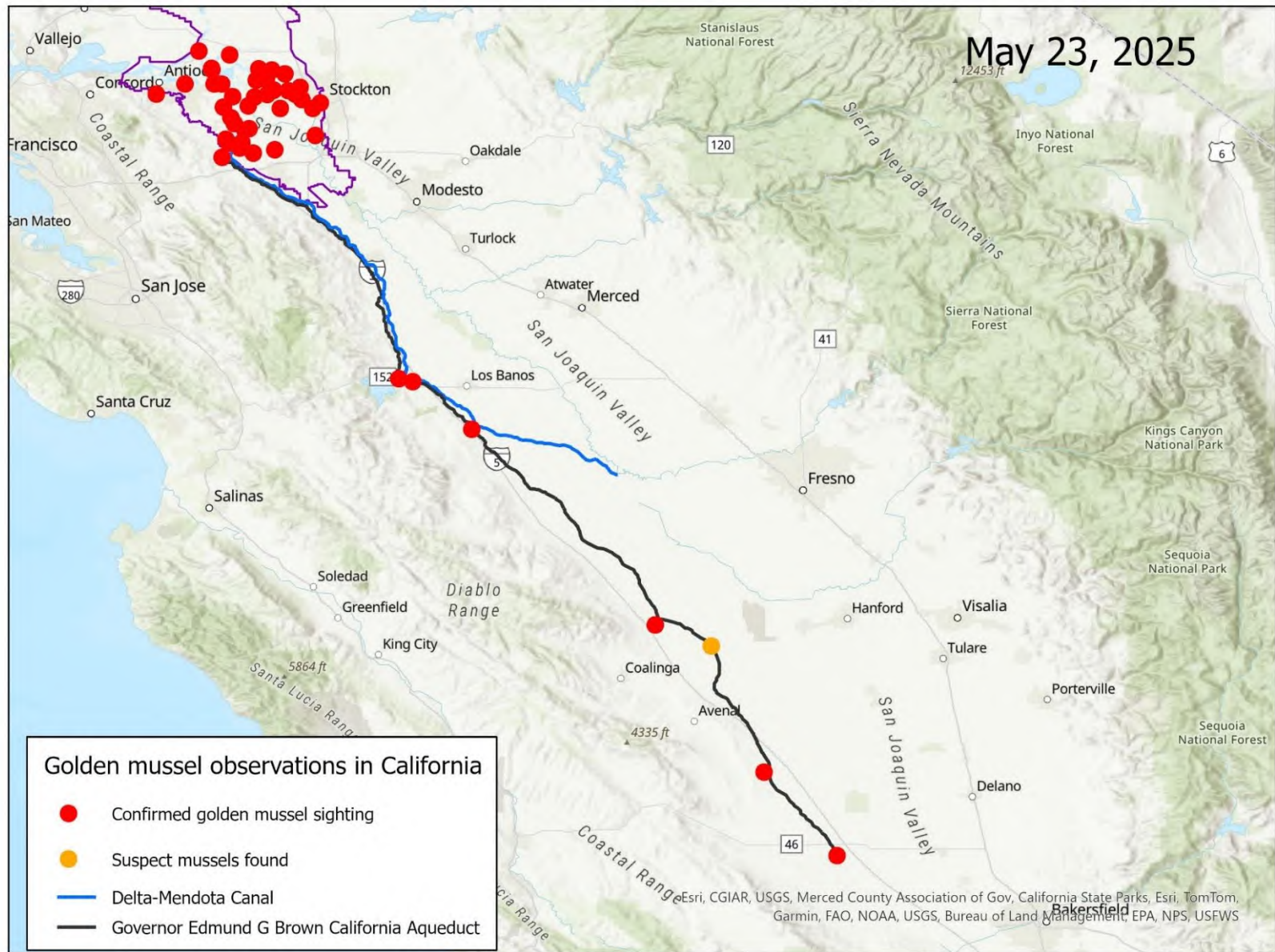
## Timeline of Detections of Golden Mussel

Through May 23, 2025

Waterbody	Location description	Date	Latitude	Longitude
Victoria Canal	Middle River Pump Station	10/17/2024	37.86669	-121.544
San Joaquin River	Rough & Ready Island	10/17/2024	37.963	-121.365
Turner Cut	Continuous water quality monitoring station	10/23/2024	37.99312	-121.454
O'Neill Forebay	San Luis Creek State Recreation Area substrate plates	10/25/2024	37.08384	-121.059
Middle River	Opposite Bullfrog Marina	10/31/2024	37.94363	-121.534
California Aqueduct	O'Neill Forebay Outlet/Check 13	10/31/2024	37.07402	-121.015
Calaveras River	Upstream from Stockton Yacht Club	11/5/2024	37.97399	-121.348
San Joaquin River	Upstream of San Joaquin River Railroad Bridge and downstream of Stockton Swing Bridge/Highway 4	11/5/2024	37.93508	-121.33
Old River	Old River Upstream of Mountain House Creek (CDEC ID: ORM)	11/7/2024	37.79384	-121.517
Old River	Old River near Tracy (CDEC ID: OLD)	11/7/2024	37.80481	-121.45
San Joaquin River	City of Stockton Ladds launch ramp	11/12/2024	37.97664	-121.375
Old River	At Contra Costa Water District's intake pumps	11/14/2024	37.88734	-121.577
Contra Costa Canal	At the Check 2 structure just east of the end of Tabora Dr.	11/14/2024	37.98001	-121.823
Middle River / Victoria Canal	At Contra Costa Water District's intake pumps	11/14/2024	37.86634	-121.544
Calaveras River	Boat house and dock floats hydrohoist	11/14/2024	37.9766	-121.345
San Joaquin River	Riverpoint Marina	11/15/2024	37.97689	-121.378
White Slough	King Island Marina Resort - Tinsley Island Launch Dock	11/21/2024	38.05543	-121.459
Dutch Slough	Bethel Island Marina	11/21/2024	38.01257	-121.641
Clifton Court Forebay	Skinner Fish Facility Louvers	11/22/2024	37.82639	-121.595
Old River	Rivers End Marina	11/25/2024	37.81015	-121.56
Italian Slough	Lazy M Marina Boat Launch Docks	11/25/2024	37.83784	-121.603
San Joaquin River	Orwood Resort	11/25/2024	37.93885	-121.611
Rock Slough	Holland Riverside Marina	11/25/2024	37.97245	-121.583
Turner Cut	Tiki Lagoon Resort and Marina Dock	11/26/2024	37.97866	-121.473
Windmill Cove - San Joaquin River	Windmill Cove Marina	11/26/2024	37.9906	-121.407
Sand Mound Slough	Emerald Point Marina	12/3/2024	38.01211	-121.617
Burns Cutoff	Farmers pipe	12/7/2024	37.96292	-121.377
San Joaquin River	Easy C's near Happy Harbor Marina	12/9/2024	38.10403	-121.592
Old River	Webb Tract Ferry	12/9/2024	38.05703	-121.647
Fisherman's Cut	Boat dock (floating)	12/9/2024	38.0619	-121.649

Waterbody	Location description	Date	Latitude	Longitude
Disappointment Slough	Paradise Point Marina	12/10/2024	38.04353	-121.418
Little Connection Slough	H1 Eight Mile Rd ferry	12/10/2024	38.05939	-121.5
Columbia Cut	Clavius Club	12/10/2024	38.02416	-121.508
San Joaquin River	Delta Yacht Club Dock	12/10/2024	38.02669	-121.477
Big Break	Big Break Marina	12/17/2024	38.01286	-121.733
Old River	Tracy Fish Facility louvers	12/18/2024	37.81671	-121.558
Bethany Reservoir	Settlement plates at the boat dock	12/30/2024	37.78108	-121.616
Coastal Aqueduct	Las Perillas Pumping Plant	2/12/2025	35.84332	-119.908
Discovery Bay	Discovery Bay Marina Boat Launch Docks	2/18/2025	37.9057	-121.587
White Slough	Village West Marina	2/24/2025	38.00123	-121.369
San Joaquin River	Hogan's Haven Acres Dock	2/24/2025	37.85042	-121.322
Dos Amigos Pumping Plant	Filter backflush debris	2/26/2025	36.92384	-120.829
Threemile Slough	Brannan Island State Recreation Area Boat Launch	3/17/2025	38.11522	-121.688
California Aqueduct	Check 24	3/20/2025	35.5812	-119.678
Stockton Channel	Morelli Park Boat Launch	4/1/2025	37.95297	-121.306
Victoria Canal	Monitoring Station	4/8/2025	37.87094	-121.53
Pleasant Valley Pumping Plant	Discharge pipeline	4/11/2025	36.30813	-120.251
Empire Cut	Found in sample collected from oblique tow at Empire Cut	4/15/2025	37.97162	-121.514
San Luis Canal	30 Left Headworks	4/30/2025	36.24065	-120.074
Whiskey Slough	Marina	5/6/2025	37.93519	-121.432
State Water Project, Coastal Branch	Polonio Pass Water Treatment Plant	5/15/2025	35.7354	-120.225

## Golden Mussel Detections as of May 23, 2025



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## Mussels

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**From** Chris Fenton [REDACTED]  
**Date** Sat 05/10/2025 11:53 AM  
**To** FGC <FGC@fgc.ca.gov>

California Delta has approximately 100 boat launch ramps and 40 small marinas. This provides numerous opportunities for boating close recreational boating until they can get stations to clean boats when they exit the delta. In California there are 1000s of boat launches into fresh water whereas the California Delta has approximately 100 boat launch ramps and 40 small marinas. People are not moving the mussels from one lake to another they're moving the mussels from the Delta. The Delta should be shut down until boat cleanings can be done after leaving the delta!! Mandatory post inspection Delta not pre lake inspection!!! If I owned a Water Agency and my waters became infested with mussels. I would sue the department of fishing California Department of Fish and Wildlife and the state of California for not stopping the spread of mussels from leaving the Delta. they know how to stop the mussels from leaving the Delta but they are not doing it!!!! If I had cancer in my right arm. And I went to the doctor to get treatment, such as radiation treatment and they started to give me radiation treatment in my legs and my feet my left arm. Would that sound like a good way to get rid of my cancer? If you think it's is NOT! Then you would also agree that not stopping the golden mussels from spreading from the Delta to the other limbs of the state is also not a good treatment!!!! Temporarily close rec boating at Delta until there are post launching cleaning stations at the Delta access ramps!!

Fresh water lakes don't have the cancer! The Delta does!! Stop the golden mussels!! The state is NOT DOING THIS CORRECTLY!!! CLOSE RECREATIONAL BOATING IN THE DELTA!!! #STOPTHESPREAD The lakes are NOT THE PROBLEM!!! 1000s of lakes are in threat because the state wants to generate income with fees for inspections/cleaning at mussel free lakes!! When they should be doing inspections and CLEANINGS of boats leaving the delta!!! Emergency closure of the delta!!! Until a real solution to stop them from leaving the delta!! Clean the boats after leaving the delta!!! Follow the science!!



Staff Summary for August 14-15, 2024  
(*For background purposes only*)

## 14. White Sturgeon Emergency Sport Fishing During California Endangered Species Act Candidacy

### Today's Item

Information ☐

Action ☒

Consider adopting emergency regulations for the sport take of white sturgeon in inland and ocean waters, pursuant to California Fish and Game Code Section 2084.

### Summary of Previous/Future Actions

- **Today's discussion and consideration of adopting emergency regulations for the sport take of white sturgeon** **August 14-15, 2024**

### Background

On November 29, 2023, the Commission received a petition to list white sturgeon as threatened under the California Endangered Species Act (CESA). The petitioners argued that long-term declines in the abundance of white sturgeon are due to (1) Central Valley water management infrastructure and operations; (2) overharvest in the sport fishery; (3) harmful algal blooms; and (4) other factors such as poaching, pollution, vessel strikes, and climate change. At its June 2024 meeting, after review of the Department's petition evaluation report, comments received, and discussion, the Commission determined that the petitioned action may be warranted.

On July 12, 2024 a notice was published in the California Regulatory Notice Register notifying the public that white sturgeon is officially a candidate species, and that white sturgeon is temporarily afforded the same protections as a species listed as threatened or endangered pursuant to Section 783.1 and Fish and Game Code Section 2085. Protections under CESA during candidacy exist to protect the species until a comprehensive, peer-reviewed status review can be completed and informed decisions made about whether to list, and how to manage, the species.

On May 28, 2024, the Nor-Cal Guides and Sportsmen's Association submitted a petition for regulation change to the Commission stating that candidacy has the potential to cause irreparable damage to the businesses and anglers who fish for white sturgeon in California's coastal, San Francisco Bay/Sacramento-San Joaquin Delta, and inland waters, noting impacts to guides, charter boat captains, and angling-associated businesses (see exhibit B5, item 17, this meeting). Likewise, at its June 19, 2024, meeting, the Commission heard testimony from members of the sturgeon angling and business community requesting that the fishery remain open with some level of take. Generally, the concern expressed was that a complete closure of the fishery during CESA candidacy would create substantial economic harm to businesses that rely on the white sturgeon fishery, including charter captains, guides, bait and tackle stores and suppliers, marinas, and related services. Such factors may be considered when authorizing some form of take under Section 2084 of the California Fish and Game Code, which allows the Commission, based on the best available scientific information, to authorize

Staff Summary for August 14-15, 2024  
 (For background purposes only)

the take any fish by hook and line for sport that is listed as an endangered, threatened, or candidate species provided that the take is consistent with CESA.

The potential for substantial economic harm, coupled with the sudden nature of the protections that candidate species receive, constitutes an emergency that authorizes the Commission to address the matter through regulation. Total closure of the white sturgeon sport fishery as a result of the species becoming a candidate species for CESA listing represents a financial crisis to Californians who rely on this fishery as part of their business, including boat captains, fishing guides, and businesses that rely on anglers such as bait and tackle stores and suppliers, marinas, and other boat services. Additionally, many of these businesses have already been impacted by other major fishery changes in the state, including two years of closure to the salmon fishery and changes to the halibut and rockfish fisheries. A Department memo (Exhibit 1) contains an estimation of economic hardships that will be produced by white sturgeon's candidacy, based on a letter from the Nor-Cal Guides and Sportsmen's Association and the Golden Gate Fishermen's Association (Exhibit 6).

The proposed regulatory action creates two new sections in Title 14 of the California Code of Regulations that supersede, but do not replace, four existing sections addressing white sturgeon fishing and report card requirements. New Section 5.78 combines most elements of existing sections 5.79 and 5.80, and defines seasons, closed areas, gear and handling restrictions, and report card requirements for catch-and-release fishing in inland waters; new Section 27.93 combines the elements of sections 27.90 and 29.72 in the same manner for ocean waters. The existing sections (5.79, 5.80, 27.90, 27.92) are currently inoperative because they are superseded by CESA take prohibitions. This action proposes the sections continue in Title 14 but remain inoperative, pending a later Commission decision about sport harvest with regard to a potential CESA listing for white sturgeon. The goal of these new regulations is to permit during the CESA status review process a catch-and-release fishery for white sturgeon since it is expected to have minimal impact on the population, while providing sport fishing opportunities for anglers and mitigating adverse economic impacts to businesses that serve sturgeon angling.

### Significant Public Comments (N/A)

### Recommendation

**Commission staff:** Adopt the proposed emergency regulation authorizing sport take of white sturgeon as proposed in Exhibit 3 and discussed today.

**Department:** Adopt the regulation as proposed in Exhibit 3.

### Exhibits

1. Department memo transmitting the original draft emergency statement, received July 29, 2024
2. Draft emergency statement and informative digest updated by staff, dated August 6, 2024
3. Draft proposed regulatory language

Staff Summary for August 14-15, 2024

*(For background purposes only)*

4. Draft economic and fiscal impact statement (STD 399) and addendum
5. Department presentation
6. Letter from James Stone, President, Nor-Cal Guides and Sportsmen's Association and James Smith, Member, Golden Gate Fishermen's Association Board of Directors, received June 4, 2024

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission finds, pursuant to Section 399 of the Fish and Game Code, that adopting the proposed emergency regulation is necessary for the immediate preservation of the public peace, health and safety, or general welfare.

The Commission further determines, based on the record, that this approval is exempt from the California Environmental Quality Act as an action necessary to prevent or mitigate an emergency as specified in Subsection 15269(c) of Title 14 of the California Code of Regulations, and Public Resources Code Section 21080(b)(4), as well as to protect a natural resource pursuant to the guidelines in California Code of Regulations, Title 14, Section 15307, and relying on Subsection 15061(b)(3) of Title 14.

The Commission further determines, pursuant to Section 11346.1 of the Government Code, that an emergency situation exists and finds the proposed regulation is necessary to address the emergency.

Therefore, the Commission adopts the emergency regulation to add sections 5.78 and 27.93, as discussed today.

Staff Summary for February 12-13, 2025  
*(For background purposes only)*

## 9. White Sturgeon Sport Fishing 2084 Regular Rulemaking

### Today's Item

Information ☐

Action ☒

Consider authorizing publication of notice of intent to amend regulations for the recreational take of, tagging of, and reporting requirements for, white sturgeon (*Acipenser transmontanus*) in inland and ocean waters, pursuant to California Fish and Game Code Section 2084.

### Summary of Previous/Future Actions

- |   |   |
|---|---|
| • Wildlife Resources Committee vetting  | September 21, 2023 and<br>January 16, 2024; WRC |
| • Adoption hearing for <i>emergency regulations</i>   | August 14-15, 2024                              |
| • Adoption hearing for first 90-day extension of<br><i>emergency regulations</i>                                      | December 11-12, 2025                            |
| • <b>Today's notice hearing for <i>regular rulemaking</i><br/>regarding recreational white sturgeon sport fishing</b> | <b>February 12-13, 2025</b>                     |
| • Discussion hearing for regular rulemaking   | April 16-17, 2025                               |
| • Adoption hearing for the second 90-day extension of<br><i>emergency regulations</i>                                 | May 14, 2025                                    |
| • Adoption hearing for regular rulemaking   | June 18-19, 2025                                |

### Background

The Commission originally adopted catch-and-release regulations for white sturgeon sport fishing as originally described in the staff summary for the August 2024 adoption of emergency regulations (Exhibit 1).

In advance of today's meeting, the Department transmitted draft documents to enable the Commission to consider continuing the emergency regulations through a regular rulemaking (Exhibit 2).

### ***Proposed Regulation Changes for Regular Rulemaking***

The draft proposed regulation changes are fundamentally the same as the emergency regulations, with several minor modifications if approved for notice today:

- Section 1.74. This section will be edited to remove sturgeon-specific information that is now found in sections 5.80 and 27.90.
- Sections 5.80 and 27.90. These sections will be edited to mirror the language in the emergency regulations (sections 5.78 and 27.93). Additionally, these sections will be edited to change the sturgeon fishing report card season from October 1 through June 30 to encompass the fishing season rather than follow the calendar year.
- Sections 5.78 and 27.93. The emergency regulations are currently in these sections, which will be allowed to expire to avoid duplication leading to potential confusion.



## Staff Summary for February 12-13, 2025

*(For background purposes only)*

- Sections 5.79 and 27.92. These sections will be repealed since all relevant report card information is now included in sections 5.80 and 27.90.
- Section 27.95. This section will be repealed and the information regarding sturgeon fishing closures will be added to sections 27.90 and 27.91.
- Section 701. The changes will amend the white sturgeon sport fishing report card fee to be a range from \$5 to \$11, to be set by the Commission at the adoption hearing, and will delete the replacement report card fee that is no longer needed.

Further details on the draft proposed amendments are available in the draft initial statement of reasons (ISOR) and draft proposed regulatory language (exhibits 3 and 4).

Today the Department will present an overview of the draft regulation (Exhibit 5).

**Significant Public Comments (N/A)****Recommendation**

**Commission staff:** Authorize publication of notice of intent to amend sections 1.74, 5.80, 5.81, 27.60 27.90, 27.91 and 701, and repeal sections 5.79, 27.92 and 27.95, as recommended by the Department and discussed today. Allow sections 5.78 and 27.93 to expire.

**Department:** Authorize publication of notice of proposed changes to the regulations regarding white sturgeon sport fishing.

**Exhibits**

1. Staff summary for Agenda Item 14, August 14-15, 2024 Commission meeting (*for background purposes only*)
2. Department memo, received December 19, 2024
3. Draft ISOR and informational digest, dated December 17, 2024
4. Draft proposed regulatory language
5. Draft economic and fiscal impact statement (STD. 399)
6. Department presentation

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission authorizes publication of a notice of its intent to amend sections 1.74, 5.80, 5.81, 27.60 27.90, 27.91 and 701, and repeal sections 5.79, 27.92 and 27.95, related to white sturgeon sport fishing as discussed today.

## Staff Summary for April 16-17, 2025

*(For background purposes only)***8. Falconry****Today's Item**Information ☐Action ☒

Consider authorizing publication of notice of intent to amend falconry regulations.

**Summary of Previous/Future Actions**

- |  |                          |
|--|--------------------------|
| • Wildlife Resources Committee vetting | January 15, 2025; WRC    |
| • <b>Today's notice hearing</b>        | <b>April 16-17, 2025</b> |
| • Discussion hearing                   | June 18-19, 2025         |
| • Adoption hearing                     | August 13-14, 2025       |

**Background**

Falconry has been a sport for thousands of years of human history across all cultures. The Commission has regulations authorizing falconry, which are primarily contained in Section 670; under that regulation, the Department oversees the practice of falconry via issuance of licenses. Only licensed falconers are permitted to possess, house, trap, transport, and use raptors for the purpose of hunting or training.

In the current license year (2024) there are approximately 600 California licensed falconers enjoying and showcasing the sport. The number of raptors in possession varies but has sometimes exceeded 1,000 birds in recent license years.

The Department requested the draft proposed amendments for the purpose of conforming certain provisions of the Falconry regulations with recent court orders and to comply with federal falconry regulations.

***Proposed Regulations Changes***

The draft proposed amendments to sections 670 and 703 will revise the regulations in three ways:

- Conform regulations and the initial and renewal falconry license applications with the recent opinion issued by the 9th Circuit U.S. Court of Appeal concerning the "certification" by applicants for falconry permits (see Exhibit 1).
- Require falconers to take only California-administered falconry examinations (i.e., not falconry examinations administered by other states).
- Delete restrictions on commercial exhibiting of falconry raptors (e.g., films, education) to conform with a district court's November 10, 2022 stipulated judgment and order (see Exhibit 2).

Further details on the draft proposed amendments are available in the draft initial statement of reasons (ISOR) and draft proposed regulatory language (exhibits 4 and 5).

Today the Department will present an overview of the draft proposed regulation changes

## Staff Summary for April 16-17, 2025

*(For background purposes only)*

(Exhibit 8).

**Significant Public Comments (N/A)****Recommendation**

**Commission staff:** Authorize publication of notice of intent to amend sections 670 and 703, as recommended by the Department and discussed today.

**Department:** Authorize publication of notice of proposed changes to the regulations regarding falconry regulations.

**Exhibits**

1. [Opinion of the United States Court of Appeals, Ninth Circuit](#) (*Stavrianoudakis, et al. v. USFWS, et al.*, Case 22-16788), filed July 24, 2024
2. [Stipulated Judgment and Order of the United States District Court](#) (*Stavrianoudakis, et al. v. USFWS, et al.*, Case 1:18-cv-01505-JLT-BAM), filed November 14, 2022
3. [Department memo](#), received April 10, 2025
4. [Draft ISOR and informational digest](#), dated March 19, 2025
5. [Draft proposed regulatory language](#)
6. [Draft proposed Department forms](#)
7. [Draft economic and fiscal impact statement \(STD. 399\)](#)
8. [Department presentation](#)

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission authorizes publication of a notice of its intent to amend sections 670 and 703 related to falconry, as discussed today.

State of California  
Fish and Game Commission  
Initial Statement of Reasons for Regulatory Action  
Amend Sections 670 and 703  
Title 14, California Code of Regulations  
Re: Falconry Regulations and Forms

I. Date of Initial Statement of Reasons: March 19, 2025

II. Dates and Locations of Scheduled Hearings

(a) Notice Hearing:

Date: April 16, 2025

Location: Sacramento, CA

(b) Discussion Hearing:

Date: May 14, 2025

Location: Webinar/Teleconference

(c) Adoption Hearing:

Date: June 19, 2025

Location: Sacramento, CA

III. Description of Regulatory Action

(a) Statement of Specific Purpose of Regulatory Change and Factual Basis for Determining that Regulation Change is Reasonably Necessary

Unless otherwise specified, all section references in this document are to Title 14 of the California Code of Regulations (CCR).

The Department of Fish and Wildlife (Department) has requested the proposed amendments for the purpose of conforming certain provisions of the Falconry regulations with recent court orders and federal Falconry regulations. It is necessary that the Fish and Game Commission:

- Conform the regulations and the initial and renewal Falconry license applications with the recent opinion issued by the 9th Circuit U.S. Court of Appeal concerning the “Certification” by applicants for Falconry permits.
- Require falconers to take only California-administered Falconry examinations (not falconry examinations administered by other states).
- Delete restrictions on commercial exhibiting of Falconry raptors (e.g., films, education) to conform with a district court’s November 10, 2022 Stipulated Judgment and Order.

Background

The present regulations of Title 14, Section 670, Falconry, were adopted by the Fish and Game Commission in 2017. Generally, the purpose of these provisions was to streamline and clarify the permitting, possession, and treatment of raptors for purposes of Falconry as defined in Section 670(b)(7) of these regulations. Possession of any live wildlife animal by persons is always unlawful, absent specific authorization and, generally, an applicable permit. Exceptions are extremely limited and highly regulated; these may include organizations such as zoos, sanctuaries, veterinary care, rehabilitation, scientific and educational activities, and the like. Only licensed Falconers are permitted to possess, house, trap, transport, and use Falconry raptors for the purpose of hunting or training.

Falconry has been a sport for thousands of years of human history across all cultures. In the current license year (2024) there are approximately 600 California licensed falconers, enjoying and showcasing the sport. Falconers are ardent caretakers and rehabilitators of the birds. The number of raptors in possession varies but has sometimes exceeded 1,000 birds in recent license years.

Falconry raptors may be any bird of the Order Falconiformes, Accipitriformes or Strigiformes, or a hybrid thereof. Additionally, a licensed falconer may capture raptor(s) from the wild in California, according to the established limits for their respective Falconry license class (Apprentice class, General class or Master class). Raptors that may be captured from the wild for use in Falconry in California are: Northern goshawk, Cooper's hawk, sharp-shinned hawk, red-tailed hawk, red-shouldered hawk, merlin, American kestrel, prairie falcon, barred owl and great horned owl. Only a Master falconer may possess eagles in accordance with 670(e)(6)(C)2.

### Proposed Regulations

#### *Amend subsection 670(e)(2)(D)*

Amend subsection 670(e)(2)(D) so that it no longer requires applicants for a falconry license to certify that they understand that their facilities, equipment, or raptors are subject to unannounced inspections, and they have read, understand and agree to abide by the applicable provisions of the Fish and Game Code and regulations promulgated thereto.

The change to section 670(e)(2)(D) conforms with the opinion issued by the U.S. Court of Appeal, 9th Circuit, in the case *Stavrianoudakis et al. v. United States Fish & Wildlife Service et al.* ((2024) 108 F.4th 1128)), in which the Department Director in his official capacity is a party), which holds that a certification signed by falconry license applicants in which they acknowledge that their facilities may be subject to unannounced inspections and that they agree to comply with all relevant laws (including laws allowing for unannounced inspections) creates an unconstitutional condition. Likewise, Forms FG 360 and FG 360b (the initial and renewal falconry applications incorporated by reference in subsection 703(b)(1)(B)) will be amended removing the relevant parts of the certification statement.

This ongoing lawsuit was filed over six years ago. To date, the Department has paid approximately \$450,000 in attorney's fees and Department staff have spent over a thousand hours helping the Department of Justice defend the Department; these changes could end this lawsuit and minimize further payment of fees and allow Department staff to work on other Department priorities.

670(e)(2)(D) Signed Certification. Each application shall contain a certification worded as follows: "I certify that I have read and am familiar with both the California and U.S. Fish and Wildlife Service falconry regulations, CFR 50, Sections 21.29 through 21.30, and that the information I am submitting is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to cancellation of the application, suspension or revocation of a license, and/or administrative, civil, or criminal penalties. ~~I understand that my facilities, equipment, or raptors are subject to unannounced inspection pursuant to subsection 670(j), Title 14, of the California Code of Regulations.~~ I certify that I have read, understand, and agree to abide by, all conditions of this license, ~~the applicable provisions of the Fish and Game Code, and the regulations promulgated thereto.~~ I certify that there are no pending or previous legal or administrative proceedings that could disqualify me from obtaining this license." The application shall be submitted with the applicant's original signature.

*Delete subsection 670(e)(3)(A)1.*

Federal falconry regulations state that state falconry regulations “may be more restrictive than these Federal standards but may not be less restrictive.” (50 C.F.R. 21.82(b)(1)(ii).) States that have regulations that are not at least as restrictive may have their licensing authority suspended. (50 C.F.R. 21.82(b)(5))

Federal falconry regulations also require that a falconry applicant take an examination administered by the state in which they wish to obtain their license. (50 C.F.R. 21.82(c)(3).) But presently, subsection 670(e)(3)(A)1 allows applicants to take out of state falconry exams. The United States Fish and Wildlife Service has notified California of this inconsistency with Federal falconry regulations, potentially placing California’s falconry program at risk of suspension. Deleting subsection 670(e)(3)(A)1. will make this regulation consistent with the federal requirement:

670(e)(3)(A) An applicant who meets one of the following criteria shall be exempt from taking the California falconry examination:

- ~~1. An applicant who provides documentation of successfully passing a federally approved examination in a state that has had its falconry regulations certified as specified in 50 CFR 21 will not be required to take the examination in California if the applicant took the examination less than five years prior to submitting an application for a California falconry license.”~~

*Amend subsection 670(h)(13)(A)*

Deleting the provisions of subsection 670(h)(13)(A) regarding commercial exhibiting of falconry birds described below is necessary to make this subsection comply with a November 10, 2022 Stipulated Judgment and Order in *Stavrianoudakis et al. v. United States Fish & Wildlife Service et al.*, in which the Department agreed not to enforce these provisions. In this case, the district court had earlier found that these provisions likely violate the First Amendment of the United States Constitution.

670(h)(13)(A) Education and Exhibiting. A licensee may use raptors in his or her possession for training purposes, education, field meets, and media (filming, photography, advertisements, etc.), as noted in 50 CFR 21, if the licensee possesses the appropriate valid federal permits, ~~as long as the raptor is primarily used for falconry and the activity is related to the practice of falconry or biology, ecology or conservation of raptors and other migratory birds. Any fees charged, compensation, or pay received during the use of falconry raptors for these purposes may not exceed the amount required to recover costs.~~ An Apprentice falconer may use the licensee's falconry raptor for education purposes only under the supervision of a General or Master falconer.”

*Necessity of the Proposed 670 Regulation Changes*

Amendments to subsection 670(e)(2)(D) and Forms FG 360, FG 360b and FG 360d are necessary to make this subsection conform with the opinion issued by the U.S. Court of Appeal, 9th Circuit, in the case *Stavrianoudakis et al. v. United States Fish & Wildlife Service et al.* ((2024) 108 F.4th 1128)), in which the Director of the Department in his official capacity is a party. This opinion holds that a certification signed by falconry license applicants in which they acknowledge that their facilities may be subject to unannounced inspections and that they agree to comply with all relevant laws (including laws allowing for unannounced inspections) creates an unconstitutional condition. These deletions would eliminate unconstitutional conditions.

Furthermore, these changes are necessary because they could help end this lawsuit and minimize further payment of fees and allow staff to work on other Department priorities. The only issue that remains in this lawsuit is whether the Plaintiffs are entitled to relief under their unconstitutional conditions claim. So far, the Department has paid approximately \$450,000 in attorney's fees, and Department staff have spent over a thousand hours working with Department of Justice attorneys to help defend the Department.

- Deleting subsection 670(e)(3)(A)1 is necessary to make California falconry regulations at least as restrictive as Federal falconry regulations and thereby prevent suspension of California's falconry licensing authority. Federal falconry regulations require that falconry applicants take exams administered by their own states. Federal falconry regulations state that state falconry regulations "may be more restrictive than these Federal standards but may not be less restrictive." (50 C.F.R. 21.82(b)(1)(ii).) States that have regulations that are not at least as restrictive may have their licensing authority suspended. (50 C.F.R. 21.82(b)(5).)
- Federal falconry regulations also require that a falconry applicant take an examination administered by the state in which they wish to obtain their license. (50 C.F.R. 21.82(c)(3).) But presently, subsection 670(e)(3)(A)1 allows applicants to take out of state falconry exams. The U.S. Fish and Wildlife has notified California of this inconsistency with Federal falconry regulations, potentially placing California's falconry program at risk of suspension. Deleting subsection 670(e)(3)(A)1 will make Section 670 consistent with the federal requirement.
- Deleting some of the provisions of subsection 670(h)(13)(A) regarding commercial exhibiting of falconry birds and fees charged is necessary to make this subsection comply with a November 10, 2022, Stipulated Judgment and Order in *Stavrianoudakis et al. v. United States Fish & Wildlife Service et al.*, in which the Department agreed not to enforce these provisions. In this case, the district court had earlier found that these provisions likely violate the First Amendment of the U.S. Constitution.

#### *Amend subsection 703(b)(1), Falconry Application forms*

The amendment updates the reference to forms incorporated by reference in subsections 703(b)(1)(B) through (E), consistent with current Department form standards and current revision dates. Amending subsection 703(b)(1) is necessary to ensure consistency with the amended forms.

#### *Amendments to forms FG 360, 360b and 360d:*

- Updating the names of each form consistent with current Department form standards and current revision date, e.g. (~~FG 360 (New 2/13)~~) (DFW 360 (Rev. 07/25)), and
  - the Department address, website, and minor grammatical edits.
  - adding "Non-binary" as a gender option is necessary for inclusivity.
  - the amounts of the fees are updated in accordance with Section 713, Fish and Game Code.
- DFW 360. Updating the applicant's certification on form DFW 360 for consistency with the amendment of subsection 670(e)(2)(D).

- DFW 360b. Updating the applicant's certification on form DFW 360b for consistency with the amendment of subsection 670(e)(2)(D); and
  - Delete the instruction specifying an examination outside California consistent with the deletion of subsection 670(e)(3)(A)1.
- DFW 360d. Updating the applicant's certification on form DFW 360d for consistency with the amendment of subsection 670(e)(2)(D).

(b) Goals and Benefits of the Regulation

The proposed amendments would:

1. Make subsection 670(e)(2)(D) comply with a 9th Circuit Court of Appeal decision that held that portions of the certification in which applicants for falconry licenses certify that they understand that their "facilities, equipment, or raptors are subject to unannounced inspection[s]" and that they "have read, understand, and agree to abide by all conditions of ...the applicable provisions of the Fish and Game Code and regulations promulgated thereto," including the unannounced inspection provision (subsection 670(j)(3)(A)), are unconstitutional conditions.
2. Updates the initial and renewal falconry license applications so that they contain current information and certifications consistent with subsection 670(e)(2)(D) and the 9th Circuit Court of Appeal decision, and update the incorporation of these applications by reference in subsection 703(b)(1)(B) so these amendments become part of the regulation.
3. Make subsection 670(e)(3)(A) consistent with Federal falconry regulations that require applicants for an apprentice falconry license to take an examination administered by the state in which they wish to obtain their license. Subsection 670(e)(3)(A)1 is proposed to be deleted, removing the allowance that California apprentice falconry license applicants may take examinations from other states, the result is, in conformance with Federal regulations, that applicants will be required to take only the California examinations.
4. Make subsection 670(h)(13)(A) consistent with the November 10, 2022 Stipulated Judgement and Order. The provisions in subsection 670(h)(13)(A) placing constraints on exhibiting are proposed for deletion.
5. Potentially save the Department tens of thousands of dollars in attorney's fees in the ongoing falconry litigation by deleting the certification language and thereby eliminating the remaining issues in the case.

(c) Authority and Reference Sections from Fish and Game Code for Regulation

Section 670

Authority cited: 200, 203, 265, 355, 356, 395, 396, 398, 710.5, 710.7, 713, 1050, 1054, 1530, 1583, 1802, 3007, 3031, 3039, 3503, 3503.5, 3511, 3513, 3800, 3801.6, 3950, 4150 and 10500, Fish and Game Code

Reference: Sections 395, 396, 713, 1050, 3007, 3031, 3503, 3503.5, 3511, 3513 and 3801.6, Fish and Game Code; Section 597, Penal Code; and Title 50, Code of Federal Regulations, Parts 21.29 and 21.30.



## Section 703

Authority cited: Sections 713, 1002, 1002.5, 1050, 1055, 2118, 2120, 2122, 2150, 2150.2, 2157 and 5060, Fish and Game Code.

Reference: Sections 395, 396, 398, 713, 1002, 1002.5, 1050, 2116, 2116.5, 2117, 2118, 2120, 2125, 2150, 2150.2, 2150.4, 2151, 2157, 2190, 2193, 2271, 3005.5, 3007, 3503, 3503.5, 3511, 3513, 3950, 5060, 5061, 10500, 12000 and 12002, Fish and Game Code; and Title 50, Code of Federal Regulations, Parts 21.29 and 21.30.

(d) Specific Technology or Equipment Required by Regulatory Change: None.

(e) Identification of Reports or Documents Supporting Regulation Change

Stipulated Judgment and Order of the United States District Court (*Stavrianoudakis, et al. v. USFWS, et al.*, Case 1:18-cv-01505-JLT-BAM), dated November 10, 2022

Opinion of the United States Court of Appeals, 9th Circuit (*Stavrianoudakis, et al. v. USFWS, et al.*, (2024) 108 F.4th 1128))

(f) Public Discussions of Proposed Regulations Prior to Notice Publication

The Department presented the proposed amendments to the Commission's Wildlife Resources Committee meeting on January 15, 2025.

## IV. Description of Reasonable Alternatives to Regulatory Action

(a) Alternatives to Regulation Change

No alternatives were identified by or brought to the attention of Commission staff that would have the same desired regulatory effect.

(b) No Change Alternative

The no change would leave the Department out of conformity with the opinion issued by the U.S. Court of Appeal, 9th Circuit, in the case *Stavrianoudakis et al. v. United States Fish & Wildlife Service et al.* ((2024) 108 F.4th 1128)). This would leave the Department vulnerable to further litigation and additional costs.

Not making the other proposed changes (i.e., allowing applicants to continue to take out of state exams) would place would leave the Department's licensing authority at risk of suspension because it would continue to be inconsistent with Federal falconry laws. Without the proposed changes, the ability of licensed Falconers in California to enjoy their sport is threatened.

## V. Mitigation measures Required by Regulatory Action

The proposed regulatory action will have no negative impact on the environment; therefore, no mitigation measures are needed.

## VI. Impact of Regulatory Action

The potential for significant statewide adverse economic impacts that might result from the proposed regulatory action has been assessed, and the following initial determinations relative to the required statutory categories have been made:

(a) Significant Statewide Adverse Economic Impact Directly Affecting Businesses, Including the Ability of California Businesses to Compete with Businesses in Other States

The proposed action will not have a significant statewide adverse economic impact directly affecting business, including the ability of California businesses to compete with businesses in other states.

- (b) Impact on the Creation or Elimination of Jobs Within the State, the Creation of New Businesses or the Elimination of Existing Businesses, or the Expansion of Businesses in California; Benefits of the Regulation to the Health and Welfare of California Residents, Worker Safety, and the State's Environment

The Commission does not anticipate benefits to jobs, businesses, the health and welfare of California residents, or of any benefits to worker safety and the State's environment.

- (C) Cost Impacts on a Representative Private Person or Business

The proposed regulation would require falconers to take the California-administered falconry examination for which the fee is currently \$69. Current regulations allow exams from other states for which the fee is reduced or non-existent. While this fee does not represent a new cost, and there are no additional fees required by this proposed regulation, this could represent an increase for those falconers who have completed their exams in other states.

The Commission is not aware of any cost impacts that a representative private business would necessarily incur in reasonable compliance with the proposed action as it imposes no new fees or costs.

- (d) Costs or Savings to State Agencies or Costs/Savings in Federal Funding to the State:

The proposed regulations may save the Department hundreds of thousands of dollars in attorney's fees in the ongoing falconry litigation by deleting the certification language and thereby eliminating the remaining issues in the case related to conformity with the opinion issued by the U.S. Court of Appeal, 9th Circuit, in the case *Stavrianoudakis et al. v. United States Fish & Wildlife Service et al.* ((2024) 108 F.4th 1128)). This lawsuit, filed over six years ago, is ongoing and so far the Department has paid approximately \$457,131 in attorney fees (\$282,131 to the California Department of Justice and \$175,000 in plaintiff's attorney fees) to defend the Department; these regulatory changes could end this lawsuit and minimize further payment of fees and allow Department staff to work on other Department priorities. In combination with the collection of approximately \$1,725 in additional fee revenue and the savings from not having to pay up to \$457,131 in additional attorney fees yields a fiscal benefit of approximately \$458,856 for the Department. See addendum to the STD 399 for further explanation.

- (e) Nondiscretionary Costs/Savings to Local Agencies: None.

- (f) Programs Mandated on Local Agencies or School Districts: None.

- (g) Costs Imposed on Any Local Agency or School District that is Required to be Reimbursed Under Part 7 (commencing with Section 17500) of Division 4, Government Code: None.

- (h) Effect on Housing Costs: None.

## VII. Economic Impact Assessment

- (a) Effects of the Regulation on the Creation or Elimination of Jobs Within the State

The Commission does not anticipate that the proposed action will have any effect on the creation or elimination of jobs within the state. Federal falconry regulations require that a falconry applicant take an examination administered by the state in which they wish to obtain their license (50 C.F.R. 21.82(c)(3)). Presently, subsection 670(e)(3)(A)1 C.C.R. allows applicants to take out of state falconry exams, but the U.S. Fish and Wildlife Service has notified California of this inconsistency with Federal falconry regulations, potentially placing California's falconry program at risk of suspension. The proposed action brings California's falconry exam requirements in line with existing Federal regulations. The proposed regulation would require falconers to take the California-administered falconry examination for which the fee is currently \$69. Current regulations allow exams from other states for which the fee is reduced or non-existent. While this fee does not represent a new cost, and there are no additional fees required by this proposed regulation, this could represent an increase for those falconers who have completed their exams in other states.

(b) Effects of the Regulation on the Creation of New Businesses or the Elimination of Existing Businesses Within the State

The Commission does not anticipate that the proposed action will have any negative or positive impacts regarding the creation of new businesses or the elimination of existing businesses within the state.

(c) Effects of the Regulation on the Expansion of Businesses Currently Doing Business Within the State

The Commission does not anticipate any expansion of businesses currently doing business within the state as a result from these proposed regulations.

(d) Benefits of the Regulation to the Health and Welfare of California Residents

The Commission does not anticipate any benefits to the health and welfare of California residents as a result from these proposed regulations.

(e) Benefits of the Regulation to Worker Safety

The Commission does not anticipate any benefits to worker safety as a result from the proposed regulations.

(f) Benefits of the Regulation to the State's Environment

The Commission does not anticipate benefits to the state's environment as a result from the proposed regulations.

(g) Other Benefits of the Regulation

The Commission does not anticipate any other benefits as a result from the proposed regulations.

## Informative Digest/Policy Statement Overview

The proposed regulatory changes amend Section 670, Title 14, CCR, Practice of Falconry, and subsection 703(b) relating to falconry forms. The Department of Fish and Wildlife (Department) has requested the proposed amendments for the purpose of conforming certain provisions of the Falconry regulations with recent court orders and federal Falconry regulations. It is necessary that the Fish and Game Commission:

- Conform the regulations and the initial and renewal Falconry license applications with the recent opinion issued by the 9th Circuit U.S. Court of Appeal concerning the “Certification” by applicants for Falconry permits.
- Require falconers to take only California-administered Falconry examinations (not falconry examinations administered by other states).
- Delete restrictions on commercial exhibiting of Falconry raptors (e.g., films, education) to conform with a district court’s November 10, 2022 Stipulated Judgment and Order.

### Proposed changes to Section 670 and 703:

- Amend subsection 670(e)(2)(D) so that the required certification conforms with the opinion issued by the U.S. Court of Appeal, 9th Circuit, in the case *Stavrianoudakis et al. v. United States Fish & Wildlife Service et al.* ((2024) 108 F.4th 1128)), which holds that a certification signed by falconry license applicants in which they acknowledge that their facilities may be subject to unannounced inspections and that they agree to comply with all relevant laws (including laws allowing for unannounced inspections) creates an unconstitutional condition.
- Deleting subsection 670(e)(3)(A)1 will make this regulation consistent with the federal requirement that a falconry applicant take an examination administered by the state in which they wish to obtain their license, 50 C.F.R. 21.82(c)(3). Presently Section 670 allows Falconry applicants to take out of state examinations, this provision is deleted.
- Deleting those provisions of subsection 670(h)(13)(A) regarding commercial exhibiting of falconry birds is necessary to make this subsection comply with a November 10, 2022 Stipulated Judgment and Order in *Stavrianoudakis et al. v. United States Fish & Wildlife Service et al.*, in which the Department agreed not to enforce these provisions. In this case, the district court had earlier found that these provisions likely violate the First Amendment of the U.S. Constitution.
- Amend subsections 703(b)(1)(B), (C) and (E), where the Falconry application forms (FG360, 360b and 360d) are incorporated by reference. The forms will be amended removing the relevant parts of the certification statement as set forth in subsection 670(e)(2)(D) and in conformance with cited opinion of the court. Other minor nonsubstantial changes are proposed.

### Benefits of the regulations

The benefits of the proposed regulations are consistency with the opinion of the court and federal law. The amended regulations benefit the licensed falconers and reduce the risk of further litigation of the Department.

### Evaluation of incompatibility with existing regulations

The Commission has reviewed its regulations in Title 14, CCR, and conducted a search of other regulations on this topic and has concluded that the proposed amendments to sections 670 and 703 are neither inconsistent nor incompatible with existing state regulations. No other state agency has the authority to promulgate falconry regulations.

## Proposed Regulatory Language

Section 670, Title 14, California Code of Regulations, is hereby amended as follows:

### § 670. Practice of Falconry.

*. . . [No change to subsections (a) through (e)(2)(C)] . . .*

(D) Signed Certification. Each application shall contain a certification worded as follows: "I certify that I have read and am familiar with both the California and U.S. Fish and Wildlife Service falconry regulation, CFR 50, Sections 21.29 through 21.30, and that the information I am submitting is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to cancellation of the application, suspension or revocation of a license, and/or administrative, civil, or criminal penalties. ~~I understand that my facilities, equipment, or raptors are subject to unannounced inspection pursuant to subsection 670(j), Title 14, of the California Code of Regulations.~~ I certify that I have read, understand, and agree to abide by, all conditions of this license, ~~the applicable provisions of the Fish and Game Code, and the regulations promulgated thereto.~~ I certify that there are no pending or previous legal or administrative proceedings that could disqualify me from obtaining this license." The application shall be submitted with the applicant's original signature.

(E) Experience. The department shall consider an applicant's falconry experience acquired in California, as well as another state or country when reviewing an application for any class of license. The department shall determine which class of falconry license is appropriate, consistent with the class requirements herein and the documentation submitted with the application demonstrating prior falconry experience.

(3) Examination Requirement. An applicant not possessing a valid falconry license, or required to apply for a new falconry license in California shall pass the falconry examination to demonstrate proficiency in falconry and raptor-related subject areas before being issued a license. An applicant shall correctly answer at least 80 percent of the questions to pass the examination. An applicant who fails to pass the examination may take another examination no earlier than the next business day following the day of the failed examination. An applicant shall submit the nonrefundable falconry examination fee specified in Section 703 each time the applicant takes an examination.

(A) An applicant who meets one of the following criteria shall be exempt from taking the California falconry examination:

~~1. An applicant who provides documentation of successfully passing a federally approved examination in a state that has had its falconry regulations certified as specified in 50 CFR 21 will not be required to take the examination in California if the applicant took the examination less than five years prior to submitting an application for a California falconry license.~~

21. The applicant is a nonresident or non-U.S. citizen falconer who has a valid falconry license issued from another state or country.

32. The applicant is a member of a federally recognized tribe and has a valid falconry license issued from that member's tribe.

. . . [No change to subsections (e)(3)(B) through (h)(12)]. . .

(13) Other Uses of Falconry Raptors. A licensee may use falconry raptors for education, exhibiting, propagation, or abatement. A licensee may transfer a wild-caught raptor to a raptor propagation permit, but the raptor shall have been used in falconry for at least two years, or at least one year for a sharp-shinned hawk, merlin, Cooper's hawk or American kestrel. A wild caught raptor may be transferred to another permit type other than falconry only if it has been injured and can no longer be used in falconry. In this case, the licensee shall provide a copy of a certification from a veterinarian to the department's License and Revenue Branch stating that the raptor is not useable in falconry.

(A) Education and Exhibiting. A licensee may use raptors in his or her possession for training purposes, education, field meets, and media (filming, photography, advertisements, etc.), as noted in 50 CFR 21, if the licensee possesses the appropriate valid federal permits, ~~as long as the raptor is primarily used for falconry and the activity is related to the practice of falconry or biology, ecology or conservation of raptors and other migratory birds. Any fees charged, compensation, or pay received during the use of falconry raptors for these purposes may not exceed the amount required to recover costs.~~ An Apprentice falconer may use the licensee's falconry raptor for education purposes only under the supervision of a General or Master falconer.

. . . [No change to subsections (h)(13)(B) through (j)]. . .

Note: Authority cited: Sections 200, 203, 265, 355, 356, 395, 396, 398, 710.5, 710.7, 713, 1050, 1054, 1530, 1583, 1802, 3007, 3031, 3039, 3503, 3503.5, 3511, 3513, 3800, 3801.6, 3950, 4150 and 10500, Fish and Game Code. Reference: Sections 395, 396, 713, 1050, 3007, 3031, 3503, 3503.5, 3511, 3513 and 3801.6, Fish and Game Code; Section 597, Penal Code; and Title 50, Code of Federal Regulations, Parts 21.29 and 21.30.

## Proposed Regulatory Language

Section 703, Title 14, California Code of Regulations, is hereby amended as follows:

### § 703. Miscellaneous Applications, Tags, Seals, Licenses, Permits, and Fees.

. . . *[No change to subsection (a)]*

(b) Applications, Forms and Fees for July 1 through June 30 (Fiscal Year).

(1) Falconry.

. . . *[No change to subsection (b)(1)(A)]*

(B) Falconry License Renewal Application (~~FG 360~~ (New 2/13 DFW 360 (Rev. 07/2025))) incorporated by reference herein.

1. An applicant for a license renewal that has not lapsed as specified in subsection 670(e) shall submit a License Renewal Application with the appropriate fee(s) listed in paragraph (b)(1)(A).

(C) New Falconry License Application (~~FG 360b~~ (New 2/13 DFW 360b (Rev. 07/2025))) incorporated by reference herein.

1. An applicant for a new license as specified in subsection 670(e) shall submit a New Falconry License Application with the appropriate fee(s) listed in paragraph (b)(1)(A).

2. An applicant for a lapsed license renewal as specified in subsection 670(e) shall submit a New Falconry License Application with the appropriate fee(s) listed in Paragraph (b)(1)(A).

(D) Apprentice Falconer's Annual Progress Report (~~FG 360c~~ (New 2/13)) incorporated by reference herein.

1. A licensed Apprentice falconer who is applying for license renewal, or within 10 calendar days after expiration of the license, whichever comes first, shall submit an Apprentice Falconer's Annual Progress Report as required in subsection 670(f).

(E) Raptor Facilities and Falconry Equipment Inspection Report (~~FG 360d~~ (New 2/13 DFW 360d (Rev. 07/2025))) incorporated by reference herein.

1. A new applicant, an applicant renewing a lapsed license, or a licensee that moves housing facilities to a new address, shall initiate an inspection by submitting a Raptor Facilities and Falconry Equipment Inspection Report as required in subsection 670(j) with the specified Inspection Fee(s) listed in paragraph (b)(1)(A).

. . . *[No change to subsections (b)(1)(F) through (c)]*

**NOTE :** Authority cited: Sections 713, 1002, 1002.5, 1050, 1055, 2118, 2120, 2122, 2150, 2150.2, 2157 and 5060, Fish and Game Code. Reference: Sections 395, 396, 398, 713, 1002, 1002.5, 1050, 2116, 2116.5, 2117, 2118, 2120, 2125, 2150, 2150.2, 2150.4, 2151, 2157, 2190, 2193, 2271, 3005.5, 3007, 3503, 3503.5, 3511, 3513, 3950, 5060, 5061, 10500, 12000 and 12002, Fish and Game Code; and Title 50, Code of Federal Regulations, Parts 21.29 and 21.30.



California Natural Resources Agency  
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

**2013-2014 2025-2026 FALCONRY LICENSE RENEWAL APPLICATION**

DFW 360 (REV. 07/2025) Page 1 of 2

**FEES: ~~\$93.73~~\$129.53 (~~\$79.57~~\$109.70 LICENSE FEE\* + \$14.16\$19.83 NONREFUNDABLE APPLICATION FEE\*)**

\*Fees include an ALDS nonrefundable three percent (3%) application fee, not to exceed \$7.50 per item. (Section 700.4, Title 14, California Code of Regulations)

**VALID JULY 1, 2013 2025 THROUGH JUNE 30, 2014 2026** If issued after July 1, valid on effective date.

Any person using raptors to take game or nongame birds or mammals shall abide by all laws and regulations related to hunting, which includes having a valid California Hunting License.

**YOU MUST INCLUDE YOUR GO ID# OR A COPY OF YOUR IDENTIFICATION WITH THIS APPLICATION. SEE INSTRUCTION ON REVERSE. TYPE OR PRINT CLEARLY.**

FIRST NAME	M.I.	LAST NAME	GO ID NUMBER (From ALDS Issued License)			
MAILING ADDRESS						DAY TELEPHONE
CITY	STATE	ZIP CODE	SEX GENDER <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/> NONBINARY		DATE OF BIRTH	
PERMANENT HOUSING FACILITY ADDRESS <input type="checkbox"/> CHECK BOX IF YOU OWN THIS			HAIR COLOR	EYE COLOR	HEIGHT	WEIGHT
PROPERTY CITY			EMAIL ADDRESS (Voluntary)			

**LIST RAPTORS CURRENTLY POSSESSED UNDER YOUR FALCONRY LICENSE (Master Falconers - Attach additional list if needed)**

SPECIES OF RAPTOR #1 (Apprentice, General or Master)	BAND NUMBER	SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/> UNK	AGE	<input type="checkbox"/> WILD CAUGHT	DATE ACQUIRED
SPECIES OF RAPTOR #2 (General or Master Class Only)	BAND NUMBER	SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/> UNK	AGE	<input type="checkbox"/> WILD CAUGHT	DATE ACQUIRED
SPECIES OF RAPTOR #3 (General or Master Class Only)	BAND NUMBER	SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/> UNK	AGE	<input type="checkbox"/> WILD CAUGHT	DATE ACQUIRED
SPECIES OF RAPTOR #4 (Master Class Only)	BAND NUMBER	SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/> UNK	AGE	<input type="checkbox"/> WILD CAUGHT	DATE ACQUIRED
SPECIES OF RAPTOR #5 (Master Class Only)	BAND NUMBER	SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/> UNK	AGE	<input type="checkbox"/> WILD CAUGHT	DATE ACQUIRED

**A SPONSOR IS REQUIRED IF APPLYING FOR AN APPRENTICE FALCONER**

FIRST NAME	M.I.	LAST NAME	DAY TELEPHONE
MAILING ADDRESS		LAST 4 DIGITS OF GO ID # (From ALDS Issued License)	DATE OF BIRTH
CITY	STATE	ZIP CODE	COUNTY

I agree to sponsor this apprentice. I agree to assist this apprentice in learning about husbandry, training of raptors, relevant laws and regulations, and deciding what species of raptor is appropriate. I hereby certify that I am either a licensed master falconer or a licensed general falconer who has at least two years of experience at the General level. In the event a license is granted for this apprentice, I understand that if I terminate sponsorship for this apprentice, I am required to immediately notify in writing the California Department of Fish and Wildlife, License and Revenue Branch, 4740 N. Market Blvd., Sacramento, CA 95834 P.O. Box 944209, Sacramento CA 94244-2090.

SPONSOR'S SIGNATURE <b>X</b>	DATE
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I certify that I have read and am familiar with both the California and U.S. Fish and Wildlife Service falconry regulations, CFR 50, Sections 21.29 through 21.30, and that the information I am submitting is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to cancellation of the application, suspension or revocation of a license, and/or administrative, civil, or criminal penalties. I understand that my facilities, equipment, or raptors are subject to unannounced inspection pursuant to Section 670(j), Title 14, of the CCR. I certify that I have read, understand, and agree to abide by all conditions of this license, the applicable provisions of the FGC, and the regulations promulgated thereto. I certify that I am not currently under any Fish and Wildlife license or permit revocation or suspension, and that there are no other legal or administrative proceedings pending that would disqualify me from obtaining this license.

APPLICANT'S SIGNATURE <b>X</b>	DATE
PARENT'S/GUARDIAN'S SIGNATURE (Required if applicant is under 18 years old.) <b>X</b>	DATE

**FOR CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE USE ONLY**

REVIEWED BY/DATE	LRB APPROVED CLASS	TRANSACTION #	ISSUED BY/DATE
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### INSTRUCTION FOR COMPLETING THE FALCONRY LICENSE RENEWAL APPLICATION

Please allow 15 business days for the processing of your application. If inspection is required, please allow an additional 30 business days. Incomplete applications will be returned and could delay the issuance of your license. Contact the License and Revenue Branch at ~~(916) 928-5849~~ (916) 928-5846 or [SPU@wildlife.ca.gov](mailto:SPU@wildlife.ca.gov), if you need additional information regarding falconry licenses.

1. It is mandatory to complete all items unless specified as voluntary.
2. Sign and date the application.
3. **IMPORTANT:** If you do not own the property where your falconry facilities are located, you must submit with this application a signed and dated statement from the property owner stating that ~~he/she~~ they agree the falconry facilities, equipment and raptors may be inspected without advance notice, as specified in Section 670(j).
4. Mail this application, your GO ID# or a copy of your identification, a Falconry Hunting Take Report, a statement from the property owner if required, and a cashier's check, money order, personal or business check\*, or credit card\*\* authorization form (online at [www.dfg.ca.gov/licensing/forms](http://www.dfg.ca.gov/licensing/forms) (under the Other Forms tab) [www.wildlife.ca.gov/licensing/falconry](http://www.wildlife.ca.gov/licensing/falconry)) with the appropriate fee to the California Department of Fish and Wildlife, License and Revenue Branch, 1740 N. Market Blvd., Sacramento, CA 95834 P.O. Box 944209, Sacramento, CA 94244-2090 ~~or apply in person.~~ **DO NOT SEND CASH.**
5. An apprentice must also submit an Apprentice Falconer's Annual Progress Report with their application, which is available online at [www.dfg.ca.gov/licensing/forms](http://www.dfg.ca.gov/licensing/forms) (under the Special Permits tab) [www.wildlife.ca.gov/licensing/falconry](http://www.wildlife.ca.gov/licensing/falconry).
6. If you move your permanent falconry facility to another location, as specified in Section 670(j), you are required to notify the Department within five days and submit a completed Raptor Facilities and Falconry Equipment Inspection Report (~~FG 360d~~ DFW 360d) and inspection fee, as specified in 703. The Department will contact you about scheduling an appointment to have your facility inspected.

**NOTE:** The Resident Falconer Raptor Capture, Recapture or Release Report (~~FG 360f~~ DFW 360f), Raptor Facilities and Falconry Equipment Inspection Report (~~FG 360d~~ DFW 360d), and Falconry Hunting Take Report (~~FG 360h~~ DFW 360h) are available at [www.dfg.ca.gov/licensing/forms](http://www.dfg.ca.gov/licensing/forms) (under the Special Permits tab) [www.wildlife.ca.gov/licensing/falconry](http://www.wildlife.ca.gov/licensing/falconry) or by contacting the Department at the address and telephone number listed above or online.

### IDENTIFICATION REQUIREMENT

Section 700.4(c), Title 14, of the California Code of Regulations (CCR) states any applicant applying for any license, tag, permit, reservation or other entitlement issued via Automated License Data System (ALDS) shall provide valid identification. Acceptable forms of identification include:

- Any license document or Get Outdoors identification number (GO ID) previously issued via ALDS
- A valid driver's license or identification card issued to him or her by the Department of Motor Vehicles or by the entity issuing driver's licenses from the licensee's state of domicile
- US Military Identification Cards (Active or reserve duty, dependent, retired member, discharged from service, medical/religious personnel)
- US Certificate or Report of Birth Abroad
- US Birth Certificate
- Tribal Identification Card, as defined by each sovereign tribal nation
- US Passport
- A foreign government-issued photo identification
- Certificate of Naturalization or Citizenship
- Birth Certificate or passport issued from a US Territory

Any applicant less than 18 years of age applying for any license, tag, permit, reservation or other entitlement issued via the ALDS shall provide valid identification. Acceptable forms of identification include any form of identification described above; or a parent or legal guardian's identification as described above.

### NOTICE

**Disclosure Statement**—Under Fish and Game Code (FGC) Sections 395-398 and Section 670, Title 14, of the California Code of Regulations, the California Department of Fish and Wildlife is authorized to collect information from applicants to maintain a record of licensure. All information requested on this application is mandatory unless otherwise indicated. An applicant's name and city of residence may be provided to the public if requested. Under FGC Section 391, other personal information submitted on this application may be released for law enforcement purposes, pursuant to court order, or for official natural resources management purposes.

A licensee may obtain a copy of ~~his/her~~ their license records maintained by the Department by submitting a written request to the Custodian of Records, License and Revenue Branch, 1740 N. Market Blvd., Sacramento, CA 95834 P.O. Box 944209, Sacramento, CA 94244-2090 or ~~lr@wildlife.ca.gov~~ [LRB@wildlife.ca.gov](mailto:LRB@wildlife.ca.gov). All requests must include the requester's name, address, and telephone number.

### PAYMENT POLICY

**\*Personal or business checks** will be accepted by the Department if name and address are imprinted on the check. Checks returned to the Department due to insufficient funds will render your license invalid. The Department may also deny the issuance or renewal of any license if a person has failed to reimburse the Department for the amount due. Any activity performed without a valid license is a violation of the Fish and Game Code and therefore subject to enforcement action.

**\*\*Credit Cards**—Licenses, permits, tags, stamps, or registrations may be purchased with a Visa or MasterCard.



California Natural Resources Agency

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

**2013-2014 2025-2026 NEW FALCONRY LICENSE APPLICATION**

DFW360b (REV. 07/2025) Page 1 of 2

~~EXAMINATION FEE: \$50.00~~ **\$69.00** (PAID AT TIME OF EXAM)**LICENSE AND APPLICATION FEES: \$93.73 \$129.53** (~~\$79.57~~ **\$109.70** LICENSE FEE\* + ~~\$14.16~~ **\$19.83** NONREFUNDABLEAPPLICATION FEE\*) AND **INSPECTION FEE\*: \$266.50 \$364.25** (UP TO FIVE ENCLOSURES) PLUS ~~\$13.13~~ **\$18.54** (FOR EACH ADDITIONAL ENCLOSURE\*).\*Fees include ~~an~~ **an** ALDS nonrefundable three percent (3%) application fee, not to exceed \$7.50 per item. (Section 700.4, Title 14, California Code of Regulations)**VALID JULY 1, 2013 2025 THROUGH JUNE 30, 2014 2026** If issued after July 1, valid on effective date.

Any person using raptors to take game or nongame birds or mammals shall abide by all laws and regulations related to hunting, which includes having a valid California Hunting License.

**YOU MUST INCLUDE YOUR GO ID# OR A COPY OF YOUR IDENTIFICATION WITH THIS APPLICATION. SEE INSTRUCTION ON REVERSE. TYPE OR PRINT CLEARLY.**

FIRST NAME	M.I.	LAST NAME		GO ID NUMBER (FROM ALDS ISSUED LICENSE)			
MAILING ADDRESS						DAY TELEPHONE	
CITY	STATE	ZIP CODE	SEX <u>GENDER</u> <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/> NON-BINARY		DATE OF BIRTH		
PERMANENT HOUSING FACILITY ADDRESS <input type="checkbox"/> CHECK BOX IF YOU OWN THIS PROPERTY			HAIR COLOR	EYE COLOR	HEIGHT	WEIGHT	
CITY	STATE	ZIP CODE	EMAIL ADDRESS (Voluntary)				

**NONRESIDENTS: LIST RAPTORS CURRENTLY POSSESSED UNDER YOUR FALCONRY LICENSE (Master Falconers - Attach additional list if needed)**

SPECIES OF RAPTOR #1 (Apprentice, General or Master)	BAND NUMBER	SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/> UNK	AGE	<input type="checkbox"/> WILD CAUGHT	DATE ACQUIRED
SPECIES OF RAPTOR #2 (General or Master Class Only)	BAND NUMBER	SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/> UNK	AGE	<input type="checkbox"/> WILD CAUGHT	DATE ACQUIRED
SPECIES OF RAPTOR #3 (General or Master Class Only)	BAND NUMBER	SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/> UNK	AGE	<input type="checkbox"/> WILD CAUGHT	DATE ACQUIRED
SPECIES OF RAPTOR #4 (Master Class Only)	BAND NUMBER	SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/> UNK	AGE	<input type="checkbox"/> WILD CAUGHT	DATE ACQUIRED
SPECIES OF RAPTOR #5 (Master Class Only)	BAND NUMBER	SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/> UNK	AGE	<input type="checkbox"/> WILD CAUGHT	DATE ACQUIRED

**A SPONSOR IS REQUIRED IF APPLYING FOR AN APPRENTICE FALCONER**

SPONSOR'S FIRST NAME	M.I.	LAST NAME		DAY TELEPHONE	
MAILING ADDRESS			LAST 4 DIGITS OF GO ID NUMBER (From ALDS Issued License)		DATE OF BIRTH
CITY	STATE	ZIP CODE	COUNTY		

I agree to sponsor this apprentice. I agree to assist this apprentice in learning about husbandry, training of raptors, relevant laws and regulations, and deciding what species of raptor is appropriate. I hereby certify that I am either a licensed master falconer or a licensed general falconer who has at least two years of experience at the General level. In the event a license is granted for this apprentice, I understand that if I terminate sponsorship for this apprentice, I am required to immediately notify in writing the California Department of Fish and Wildlife, License and Revenue Branch, 1740 N. Market Blvd., Sacramento, CA 95834 P.O. Box 944209, Sacramento CA 94244-2090.

SPONSOR'S SIGNATURE	DATE
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**X**

I certify that I have read and am familiar with both the California and U.S. Fish and Wildlife Service falconry regulations, CFR 50, Sections 21.29 through 21.30, and that the information I am submitting is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to cancellation of the application, suspension or revocation of a license, and/or administrative, civil, or criminal penalties. I understand that my facilities, equipment, or raptors are subject to unannounced inspection pursuant to Section 670(j), Title 14, of the CCR. I certify that I have read, understand, and agree to abide by all conditions of this license, the applicable provisions of the FGC, and the regulations promulgated thereto. I certify that I am not currently under any Fish and Wildlife license or permit revocation or suspension, and that there are no other legal or administrative proceedings pending that would disqualify me from obtaining this license.

APPLICANT'S SIGNATURE	DATE
PARENT'S/GUARDIAN'S SIGNATURE (Required if applicant is under 18 years old.)	DATE

**FOR CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE USE ONLY**

CDFW OFFICE	CDFW EXAMINATION FEE TRANSACTION #	CDFW FALCONRY EXAM <input type="checkbox"/> PASS <input type="checkbox"/> FAIL If applicant fails, they may retake the exam the next business day.	
REVIEWED BY/DATE	LRB APPROVED CLASS	TRANSACTION #	ISSUED BY/DATE

## INSTRUCTION FOR COMPLETING THE NEW FALCONRY LICENSE APPLICATION

Please allow 45 business days for the processing of your application. A person applying for a California falconry license for the first time or renewing a license that has lapsed for five or more years must take and pass a written examination given at any California Department of Fish and Wildlife (Department) office listed below and have their facility inspected by the Department. ~~An applicant who provides documentation of successfully passing a federally approved examination in a state that has had its falconry regulations certified as specified in Title 50, CFR, Section 21.29, will not be required to take the examination in California if the applicant took the exam within five years from the date the application was submitted.~~ Applicants must be 12 years of age or older to be issued an apprentice license and may possess only a red-tailed hawk or an American kestrel. Applicants under 18 years of age must have a parent or guardian co-sign this application.

Incomplete applications will be returned and could delay the issuance of your license. Contact the License and Revenue Branch at (916) 928-5849 (916) 928-5846 or [SPU@wildlife.ca.gov](mailto:SPU@wildlife.ca.gov), if you need additional information regarding falconry licenses.

1. It is mandatory to complete all items unless specified as voluntary.
2. Sign and date the application.
3. Make a reservation to take the exam at the CDFW Department office listed below nearest you. The written exam will take approximately two hours and will be scored while you are present. If you fail the exam, you may take another examination no earlier than the next business day following the date of the failed examination.
4. Take this completed application, the examination fee, and a copy of your identification with you to the exam.

Upon passing the exam:

5. **IMPORTANT:** You must have your permanent falconry facilities built and ready to be inspected by the Department when you submit this application. Submit a completed Raptor Facilities and Falconry Equipment Inspection Report (FG-360d DFW 360d) and the inspection fee, as specified in Section 703 with this application. Your permanent falconry facility must pass an inspection by the Department, as specified in Section 670(j) before your license may be issued. The Department will contact you about scheduling an appointment to have your facility inspected.  
If you do not own the property where your falconry facilities are located, you must submit with this application a signed and dated statement from the property owner stating that ~~he/she/they~~ agrees/agree the falconry facilities, equipment and raptors may be inspected without advance notice, as specified in Section 670(j).
6. Mail this application, the completed Raptor Facilities and Falconry Equipment Inspection Report, a copy of your identification, a statement from the property owner if required, and a cashier's check, money order, personal or business check\*, or credit card\*\* authorization form (online at [www.dfg.ca.gov/licensing/forms](http://www.dfg.ca.gov/licensing/forms) (under the Other Forms tab) [www.wildlife.ca.gov/licensing/falconry](http://www.wildlife.ca.gov/licensing/falconry)) with the license, application and inspection fees to the California Department of Fish and Wildlife, License and Revenue Branch, 1740 N. Market Blvd., Sacramento, CA 95834 P.O. Box 944209, Sacramento, CA 94244-2090 or apply in person. **DO NOT SEND CASH.**

**NOTE:** The Resident Falconer Raptor Capture, Recapture or Release Report (FG-360f DFW 360f), Raptor Facilities and Falconry Equipment Inspection Report (FG-360d DFW 360d), and Falconry Hunting Take Report (FG-360h DFW 360h) are available at [www.dfg.ca.gov/licensing/forms](http://www.dfg.ca.gov/licensing/forms) (under the Special Permits tab) [www.wildlife.ca.gov/licensing/falconry](http://www.wildlife.ca.gov/licensing/falconry) or by contacting the Department at the address and telephone number listed above or online.

### IDENTIFICATION REQUIREMENT

Section 700.4(c), Title 14, of the California Code of Regulations (CCR) states any applicant applying for any license, tag, permit, reservation or other entitlement issued via Automated License Data System (ALDS) shall provide valid identification. Acceptable forms of identification include:

- Any license document or Get Outdoors Identification number (GO ID) previously issued via ALDS
- A valid driver's license or identification card issued to him or her by the Department of Motor Vehicles or by the entity issuing driver's licenses from the licensee's state of domicile
- US Military Identification Cards (Active or reserve duty, dependent, retired member, discharged from service, medical/religious personnel)
- US Certificate or Report of Birth Abroad
- US Birth Certificate
- Tribal Identification Card, as defined by each sovereign tribal nation
- US Passport
- A foreign government-issued photo identification
- Certificate of Naturalization or Citizenship
- Birth Certificate or passport issued from a US Territory

Any applicant less than 18 years of age applying for any license, tag, permit, reservation or other entitlement issued via the ALDS shall provide valid identification. Acceptable forms of identification include any form of identification described above; or a parent or legal guardian's identification as described above.

### NOTICE

**Disclosure Statement**—Under Fish and Game Code (FGC) Sections 395-398 and Section 670, Title 14, of the California Code of Regulations, the California Department of Fish and Wildlife is authorized to collect information from applicants to maintain a record of licensure. All information requested on this application is mandatory unless otherwise indicated. An applicant's name and city of residence may be provided to the public if requested. Under FGC Section 391, other personal information submitted on this application may be released for law enforcement purposes, pursuant to court order, or for official natural resources management purposes.

A licensee may obtain a copy of his/her their license records maintained by the Department by submitting a written request to the Custodian of Records, License and Revenue Branch, 1740 N. Market Blvd., Sacramento, CA 95834 P.O. Box 944209, Sacramento, CA 94244-2090 or [LRB@dfg.ca.gov](mailto:LRB@dfg.ca.gov) [LRB@wildlife.ca.gov](mailto:LRB@wildlife.ca.gov). All requests must include the requester's name, address, and telephone number.

### PAYMENT POLICY

**\*Personal or business checks** will be accepted by the Department if name and address are imprinted on the check. Checks returned to the Department due to insufficient funds will render your license invalid. The Department may also deny the issuance or renewal of any license if a person has failed to reimburse the Department for the amount due. Any activity performed without a valid license is a violation of the Fish and Game Code and therefore subject to enforcement action.

**\*\*Credit Cards**—Licenses, permits, tags, stamps, or registrations may be purchased with a Visa or MasterCard.

### CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE OFFICES

[www.dfg.ca.gov](http://www.dfg.ca.gov) [www.wildlife.ca.gov](http://www.wildlife.ca.gov)

**FRESNO** — 1234 East Shaw Avenue, Fresno, CA 93710, (559) 222-3761 Ext. 151

**LOS ALAMITOS** — 4665 Lampson Avenue, Suite C, Los Alamitos, CA 90720, (562) 596-3885

**MONTEREY** — 21 Lower Ragsdale Drive, Suite 100, Monterey, CA 93940, (831) 649-2870

**NAPA FAIRFIELD** — 7329 Silverado Trail, Napa, CA 94558, (707) 944-5500 2825 Cordelia Road, Suite 100, Fairfield, CA

FG-360b (New 2/13)

94534, (707) 428-2002

**RANCHO CORDOVA** — 1701 Nimbus Road, Rancho Cordova, CA 95670, (916) 358-2900

**REDDING** — 601 Locust Street, Redding, CA 96001, (530) 225-2300

**SAN DIEGO** — 3883 Ruffin Road, San Diego, CA 92123, (858) 467-4201

**EUREKA** — 619 2<sup>nd</sup> Street, Eureka, CA 95501 (707) 445-6493



California Natural Resources Agency  
DEPARTMENT OF FISH AND WILDLIFE

**2013-2014 2025-2026 RAPTOR FACILITIES AND FALCONRY EQUIPMENT INSPECTION REPORT**

DFW 360d (REV. 07/2025) Page 1 of 2

**INSPECTION FEE: ~~\$266.50~~ \$364.25\*** (Five enclosures or less)

**ADDITIONAL INSPECTION FEE: ~~\$13.13~~ \$18.54\*** (Required for each enclosure over five)

**RE-INSPECTION FEE: ~~\$222.48~~ \$305.00\*** (Required for violations or non-compliance issues)

\*Fees includes an ALDS nonrefundable three percent (3%) application fee, not to exceed \$7.50 per item (Section 700.4, Title 14, California Code of Regulations)

**INSTRUCTIONS FOR APPLICANT OR LICENSEE: ONLY COMPLETE PARTS I AND II.** Upon completion, submit **ALL COPIES** of this report along with a cashier's check, money order, personal or business check, or credit card authorization form at [www.wildlife.ca.gov/Licensing/Falconry](http://www.wildlife.ca.gov/Licensing/Falconry) for the appropriate inspection fee(s) (based on the number of enclosures that will be inspected) to the Department of Fish and Wildlife, License and Revenue Branch, 1740 N Market Blvd., Sacramento, CA 95834 P.O. Box 944209, Sacramento, CA 94244-2090. The Department will contact you to schedule the inspection. Contact the License and Revenue Branch at (916) 928-5846 or [SPU@wildlife.ca.gov](mailto:SPU@wildlife.ca.gov) if you need additional information regarding falconry licenses.

**PART I**

FIRST NAME	M.I.	LAST NAME	EMAIL ADDRESS
MAILING ADDRESS			DAY TELEPHONE
CITY	STATE	ZIP CODE	NUMBER OF ENCLOSURES
PERMANENT HOUSING FACILITY ADDRESS	CITY	ZIP CODE	COUNTY

**PART II – RAPTOR (S) PRESENT** (Master Falconers - Attach additional list if needed)

Species of Raptor #1 (Apprentice, General or Master)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #2 (General or Master)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #3 (General or Master)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #4 (Master Class Only)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #5 (Master Class Only)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #6 (Master Class Only)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #7 (Master Class Only)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #8 (Master Class Only)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #9 (Master Class Only)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #10 (Master Class Only)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #11 (Master Class Only)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #12 (Master Class Only)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #13 (Master Class Only)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #14 (Master Class Only)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired
Species of Raptor #15 (Master Class Only)	Band Number	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unk	Age	<input type="checkbox"/> Wild Caught	Date Acquired

**INSTRUCTIONS FOR CDFW OFFICER:** Upon completion of all parts of the Raptor Facilities and Falconry Equipment Inspection Report, provide the falconer with the original (white) copy and submit to the License and Revenue Branch a copy by email to [SPU@wildlife.ca.gov](mailto:SPU@wildlife.ca.gov). Retain the second (white) a copy for your records.



**PART III - FACILITIES** (Section 670(j), Title 14, of the CCR and Title 50, CFR, Section 21.29)

	YES	NO
A. MEW (Indoor Facility)		
1. Space to allow easy access and maintenance	<input type="checkbox"/>	<input type="checkbox"/>
2. Space to allow raptor(s) to fully extend wings	<input type="checkbox"/>	<input type="checkbox"/>
3. At least one window provided	<input type="checkbox"/>	<input type="checkbox"/>
4. Each window with vertical bars/rods on inside	<input type="checkbox"/>	<input type="checkbox"/>
5. At least one secure door - can be easily closed	<input type="checkbox"/>	<input type="checkbox"/>
6. Other doors, if any, serve to protect facility	<input type="checkbox"/>	<input type="checkbox"/>
7. Floor surface dry or well drained - can be easily cleaned	<input type="checkbox"/>	<input type="checkbox"/>
8. One perch of an acceptable design for each raptor	<input type="checkbox"/>	<input type="checkbox"/>
B. WEATHERING AREA		
1. Space to allow tethered raptor(s) to bate ( <i>attempted flight</i> ) without striking wings on side or top of facility	<input type="checkbox"/>	<input type="checkbox"/>
2. Sides of facility fenced with suitable material to exclude predators	<input type="checkbox"/>	<input type="checkbox"/>
3. Top of facility covered with netting, wire, or roofed to exclude predators	<input type="checkbox"/>	<input type="checkbox"/>
4. Top of facility open provided weathering perch(es) are greater than 6.5 feet in height	<input type="checkbox"/>	<input type="checkbox"/>
C. ENVIRONMENTAL PROTECTION - The facilities, singly or in combination, provide adequate protection to the raptor(s) from:		
1. Excessive heat	<input type="checkbox"/>	<input type="checkbox"/>
2. High winds and winter storms	<input type="checkbox"/>	<input type="checkbox"/>
3. Avian and ground predators	<input type="checkbox"/>	<input type="checkbox"/>
4. Disturbance which would likely cause injury	<input type="checkbox"/>	<input type="checkbox"/>

**PART IV - EQUIPMENT** (Section 670(j), Title 14, of the CCR and Title 50, CFR, Section 21.29)

A. RAPTOR EQUIPMENT		
1. One pair of Alymeri (style) jesses for each raptor ( <i>An Alymeri jess consists of an anklet, grommet, and a removable strap for attaching the anklet and grommet to the swivel</i> )	<input type="checkbox"/>	<input type="checkbox"/>
2. One swivel of an acceptable design for each raptor ( <i>Dog leash/fishing snap-swivels, and swivels with soft copper/aluminum rivets are rarely acceptable, except for use on kestrels</i> )	<input type="checkbox"/>	<input type="checkbox"/>
3. One leash of quality leather or synthetic material for each raptor	<input type="checkbox"/>	<input type="checkbox"/>
B. REQUIRED ANCILLARY EQUIPMENT		
1. One bath container, 2 - 6 inches deep and wider than length of the raptor for each bird	<input type="checkbox"/>	<input type="checkbox"/>
2. One outdoor perch of an acceptable design for each raptor	<input type="checkbox"/>	<input type="checkbox"/>
3. A reliable weighing scale or balance graduated in increments of not more than .5 ounce ( <i>15 grams</i> )	<input type="checkbox"/>	<input type="checkbox"/>

**PART V – CERTIFICATION**

- ☐ **APPROVED** - Facilities and equipment meet federal/state standards.
- ☐ **CHECK HERE IF THIS IS A RE-INSPECTION**
- ☐ **PROVISIONAL APPROVAL** - Except as indicated in corrections required below, facilities and equipment meet federal/state standards.
- ☐ **NOT APPROVED** (*List corrections needed below*) - Facilities and equipment fail to meet federal/state standards.
- ☐ **CORRECTIONS REQUIRED** \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Pursuant to Section 670(j), Title 14, of the CCR, equipment or housing that does not meet the minimum standards required by regulations shall not be certified by the Department.

**CERTIFYING DEPARTMENT OFFICER**

FIRST NAME	M.I.	LAST NAME	TITLE
SIGNATURE			DATE
<b>X</b>			

**APPLICANT/LICENSEE**

*I agree to correct deficiencies, if any, within 30 days and to maintain facilities/equipment at or above federal/state standards. I understand the Department's employees may enter my premises at any reasonable hour to inspect the facilities/equipment.*

SIGNATURE	DATE
<b>X</b>	

# ECONOMIC AND FISCAL IMPACT STATEMENT (REGULATIONS AND ORDERS)

STD. 399 (Rev. 10/2019)

## ECONOMIC IMPACT STATEMENT

DEPARTMENT NAME <b>California Fish and Game Commission</b>	CONTACT PERSON <b>David Thesell</b>	EMAIL ADDRESS <b>fgc@fgc.ca.gov</b>	TELEPHONE NUMBER <b>916 201-6201</b>
DESCRIPTIVE TITLE FROM NOTICE REGISTER OR FORM 400 <b>Amend Sections 670 and 703, Title 14 CCR, Re: Falconry Regulations and Forms</b>			NOTICE FILE NUMBER <b>Z</b>

### A. ESTIMATED PRIVATE SECTOR COST IMPACTS *Include calculations and assumptions in the rulemaking record.*

1. Check the appropriate box(es) below to indicate whether this regulation:

- |  |   |
|--|---|
| <input type="checkbox"/> a. Impacts business and/or employees  | <input type="checkbox"/> e. Imposes reporting requirements              |
| <input type="checkbox"/> b. Impacts small businesses           | <input type="checkbox"/> f. Imposes prescriptive instead of performance |
| <input type="checkbox"/> c. Impacts jobs or occupations        | <input checked="" type="checkbox"/> g. Impacts individuals              |
| <input type="checkbox"/> d. Impacts California competitiveness | <input type="checkbox"/> h. None of the above (Explain below):          |

*If any box in Items 1 a through g is checked, complete this Economic Impact Statement.  
If box in Item 1.h. is checked, complete the Fiscal Impact Statement as appropriate.*

2. The **California Fish and Game Commission** estimates that the economic impact of this regulation (which includes the fiscal impact) is:  
(Agency/Department)

- ☒ Below \$10 million  
☐ Between \$10 and \$25 million  
☐ Between \$25 and \$50 million  
☐ Over \$50 million *[If the economic impact is over \$50 million, agencies are required to submit a [Standardized Regulatory Impact Assessment](#) as specified in Government Code Section 11346.3(c)]*

3. Enter the total number of businesses impacted: 0

Describe the types of businesses (Include nonprofits): N/A. No businesses affected by regulations for individual falconry license exams.

Enter the number or percentage of total businesses impacted that are small businesses: 0

4. Enter the number of businesses that will be created: 0 eliminated: 0

Explain: N/A. No businesses affected by regulations for individual falconry license examinations.

5. Indicate the geographic extent of impacts: ☒ Statewide  
☐ Local or regional (List areas): \_\_\_\_\_

6. Enter the number of jobs created: 0 and eliminated: 0

Describe the types of jobs or occupations impacted: N/A. The proposed amendments to regulations for individual falconry license examinations administered by the California Department of Fish and Wildlife do not impact any jobs or occupations.

7. Will the regulation affect the ability of California businesses to compete with other states by making it more costly to produce goods or services here? ☐ YES ☒ NO

If YES, explain briefly: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**ECONOMIC IMPACT STATEMENT (CONTINUED)**

**B. ESTIMATED COSTS** *Include calculations and assumptions in the rulemaking record.*

1. What are the total statewide dollar costs that businesses and individuals may incur to comply with this regulation over its lifetime? \$ 1,967.50
- a. Initial costs for a small business: \$ \_\_\_\_\_ Annual ongoing costs: \$ \_\_\_\_\_ Years: \_\_\_\_\_
- b. Initial costs for a typical business: \$ \_\_\_\_\_ Annual ongoing costs: \$ \_\_\_\_\_ Years: \_\_\_\_\_
- c. Initial costs for an individual: \$ 78.70 Annual ongoing costs: \$ 0 Years: 1
- d. Describe other economic costs that may occur: There are indirect costs for taking the falconry exam - applicants must drive to a facility to take the exam in person. The exam is only taken once, so no ongoing costs are anticipated. See addendum.
2. If multiple industries are impacted, enter the share of total costs for each industry: No industries are affected by the proposed amendments to regulations for individual falconry licenses.
3. If the regulation imposes reporting requirements, enter the annual costs a typical business may incur to comply with these requirements. Include the dollar costs to do programming, record keeping, reporting, and other paperwork, whether or not the paperwork must be submitted. \$ 0
4. Will this regulation directly impact housing costs? ☐ YES ☒ NO
- If YES, enter the annual dollar cost per housing unit: \$ \_\_\_\_\_
- Number of units: \_\_\_\_\_
5. Are there comparable Federal regulations? ☒ YES ☐ NO
- Explain the need for State regulation given the existence or absence of Federal regulations: CA must bring its falconry exam regulations into compliance with federal regulations (50 C.F.R. 21.82(c)(3)), failing to do so risks placing California's falconry program at risk of suspension, reducing opportunity for falconers.
- Enter any additional costs to businesses and/or individuals that may be due to State - Federal differences: \$ 78.70 see addendum.

**C. ESTIMATED BENEFITS** *Estimation of the dollar value of benefits is not specifically required by rulemaking law, but encouraged.*

1. Briefly summarize the benefits of the regulation, which may include among others, the health and welfare of California residents, worker safety and the State's environment: The U.S. Fish and Wildlife Service has notified CA of this inconsistency with federal falconry regulations, potentially placing California's falconry program at risk of suspension. Without the proposed changes, the ability of licensed falconers to enjoy their sport is reduced.
2. Are the benefits the result of: ☒ specific statutory requirements, or ☐ goals developed by the agency based on broad statutory authority?
- Explain: Federal falconry regulations require an applicant take an exam administered by their state (50 C.F.R. 21.82(c)(3)).
3. What are the total statewide benefits from this regulation over its lifetime? \$ 2,212,812 annually
4. Briefly describe any expansion of businesses currently doing business within the State of California that would result from this regulation: None.
- The Commission does not anticipate that any businesses currently doing business within the State will expand their operations as a result of the proposed regulation changes.

**D. ALTERNATIVES TO THE REGULATION** *Include calculations and assumptions in the rulemaking record. Estimation of the dollar value of benefits is not specifically required by rulemaking law, but encouraged.*

1. List alternatives considered and describe them below. If no alternatives were considered, explain why not: Without the proposed changes the Department's licensing authority is at risk of suspension due to inconsistency with federal falconry laws and lack of conformity with the U.S. Court of Appeals (9th Circuit) opinion in Stavrianoudakis et al. v. United States Fish & Wildlife Service et al. ((2024) 108 F.4th 1128)), leaving the State vulnerable to further litigation and additional costs.



# ECONOMIC AND FISCAL IMPACT STATEMENT (REGULATIONS AND ORDERS)

STD. 399 (Rev. 10/2019)

## ECONOMIC IMPACT STATEMENT (CONTINUED)

2. Summarize the total statewide costs and benefits from this regulation and each alternative considered:

Regulation: Benefit: \$ 0 Cost: \$ 1,967.50

Alternative 1: Benefit: \$ \_\_\_\_\_ Cost: \$ \_\_\_\_\_

Alternative 2: Benefit: \$ \_\_\_\_\_ Cost: \$ \_\_\_\_\_

3. Briefly discuss any quantification issues that are relevant to a comparison of estimated costs and benefits for this regulation or alternatives: No alternatives were identified by or brought to the attention of staff that would have the same desired regulatory effect; therefore, no costs and benefits were estimated for any alternatives.

4. Rulemaking law requires agencies to consider performance standards as an alternative, if a regulation mandates the use of specific technologies or equipment, or prescribes specific actions or procedures. Were performance standards considered to lower compliance costs? ☐ YES ☒ NO

Explain: Performance standards were not considered as they would not have the desired effect of conforming to federal regulations and reducing the State's risk of continued litigation.

### E. MAJOR REGULATIONS *Include calculations and assumptions in the rulemaking record.*

*California Environmental Protection Agency (Cal/EPA) boards, offices and departments are required to submit the following (per Health and Safety Code section 57005). Otherwise, skip to E4.*

1. Will the estimated costs of this regulation to California business enterprises exceed \$10 million? ☐ YES ☒ NO

*If YES, complete E2. and E3*

*If NO, skip to E4*

2. Briefly describe each alternative, or combination of alternatives, for which a cost-effectiveness analysis was performed:

Alternative 1: \_\_\_\_\_

Alternative 2: \_\_\_\_\_

*(Attach additional pages for other alternatives)*

3. For the regulation, and each alternative just described, enter the estimated total cost and overall cost-effectiveness ratio:

Regulation: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

Alternative 1: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

Alternative 2: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

4. Will the regulation subject to OAL review have an estimated economic impact to business enterprises and individuals located in or doing business in California exceeding \$50 million in any 12-month period between the date the major regulation is estimated to be filed with the Secretary of State through 12 months after the major regulation is estimated to be fully implemented?

☐ YES ☒ NO

*If YES, agencies are required to submit a [Standardized Regulatory Impact Assessment \(SRIA\)](#) as specified in Government Code Section 11346.3(c) and to include the SRIA in the Initial Statement of Reasons.*

5. Briefly describe the following:

The increase or decrease of investment in the State: None. The amendments to regulations only affect individual falconers who take their examinations out of state.

The incentive for innovation in products, materials or processes: None. The amendments to regulations only affect individual falconers who take their examinations out of state.

The benefits of the regulations, including, but not limited to, benefits to the health, safety, and welfare of California residents, worker safety, and the state's environment and quality of life, among any other benefits identified by the agency: Without amendments to regulations, the Department's licensing authority is at risk of suspension due to inconsistency with federal law; falconry opportunity would be reduced.

# ECONOMIC AND FISCAL IMPACT STATEMENT (REGULATIONS AND ORDERS)

STD. 399 (Rev. 10/2019)

## FISCAL IMPACT STATEMENT

### A. FISCAL EFFECT ON LOCAL GOVERNMENT *Indicate appropriate boxes 1 through 6 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*

- ☐ 1. Additional expenditures in the current State Fiscal Year which are reimbursable by the State. (Approximate)  
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

\$ \_\_\_\_\_

- ☐ a. Funding provided in \_\_\_\_\_

Budget Act of \_\_\_\_\_ or Chapter \_\_\_\_\_, Statutes of \_\_\_\_\_

- ☐ b. Funding will be requested in the Governor's Budget Act of \_\_\_\_\_

Fiscal Year: \_\_\_\_\_

- ☐ 2. Additional expenditures in the current State Fiscal Year which are NOT reimbursable by the State. (Approximate)  
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

\$ \_\_\_\_\_

*Check reason(s) this regulation is not reimbursable and provide the appropriate information:*

- ☐ a. Implements the Federal mandate contained in \_\_\_\_\_

- ☐ b. Implements the court mandate set forth by the \_\_\_\_\_ Court.

Case of: \_\_\_\_\_ vs. \_\_\_\_\_

- ☐ c. Implements a mandate of the people of this State expressed in their approval of Proposition No. \_\_\_\_\_

Date of Election: \_\_\_\_\_

- ☐ d. Issued only in response to a specific request from affected local entity(s).

Local entity(s) affected: \_\_\_\_\_  
\_\_\_\_\_

- ☐ e. Will be fully financed from the fees, revenue, etc. from: \_\_\_\_\_

Authorized by Section: \_\_\_\_\_ of the \_\_\_\_\_ Code;

- ☐ f. Provides for savings to each affected unit of local government which will, at a minimum, offset any additional costs to each;

- ☐ g. Creates, eliminates, or changes the penalty for a new crime or infraction contained in \_\_\_\_\_

- ☐ 3. Annual Savings. (approximate)

\$ \_\_\_\_\_

- ☐ 4. No additional costs or savings. This regulation makes only technical, non-substantive or clarifying changes to current law regulations.

- ☒ 5. No fiscal impact exists. This regulation does not affect any local entity or program.

- ☐ 6. Other. Explain \_\_\_\_\_  
\_\_\_\_\_

**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

STD. 399 (Rev. 10/2019)

**FISCAL IMPACT STATEMENT (CONTINUED)****B. FISCAL EFFECT ON STATE GOVERNMENT** *Indicate appropriate boxes 1 through 4 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*☐ 1. Additional expenditures in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

*It is anticipated that State agencies will:*☐ a. Absorb these additional costs within their existing budgets and resources.☐ b. Increase the currently authorized budget level for the \_\_\_\_\_ Fiscal Year☐ 2. Savings in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

☐ 3. No fiscal impact exists. This regulation does not affect any State agency or program.☒ 4. Other. Explain Potentially, a small increase in revenue while saving the Department tens of thousands of dollars in attorney's fees in ongoing falconry litigation by deleting certification language and thereby eliminating remaining issues in the case, for a net benefit of approximately \$458,856.20. See addendum.**C. FISCAL EFFECT ON FEDERAL FUNDING OF STATE PROGRAMS** *Indicate appropriate boxes 1 through 4 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*☐ 1. Additional expenditures in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_


☐ 2. Savings in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

☒ 3. No fiscal impact exists. This regulation does not affect any federally funded State agency or program.☐ 4. Other. Explain \_\_\_\_\_

FISCAL OFFICER SIGNATURE

DocuSigned by:

 Dan Reagan


6558B761E2D347D...

DATE

4/21/2025

*The signature attests that the agency has completed the STD. 399 according to the instructions in SAM sections 6601-6616, and understands the impacts of the proposed rulemaking. State boards, offices, or departments not under an Agency Secretary must have the form signed by the highest ranking official in the organization.*

AGENCY SECRETARY


 Melissa A. Miller-Henson

DATE

4/18/2025

*Finance approval and signature is required when SAM sections 6601-6616 require completion of Fiscal Impact Statement in the STD. 399.*

DEPARTMENT OF FINANCE PROGRAM BUDGET MANAGER

 Bryan Cash

DATE

4/22/2025

## **STD. 399 Addendum**

### **Amend Sections 670 and 703 of Title 14, California Code of Regulations, Regarding Falconry Regulations and Forms**

#### **Background**

The purpose of the proposed amendments to falconry regulations is to allow the California Department of Fish and Wildlife (Department) to make certain provisions conform with court orders and federal falconry regulations.

The present regulations in Title 14, Section 670, Falconry, were adopted by the California Fish and Game Commission in 2013 and became operative January 1, 2014. Generally, the purpose of these provisions was to streamline and clarify the permitting, possession, and treatment of raptors for purposes of falconry as defined in subsection 670(b)(7) of the regulations. Possession of any live wildlife animal by persons is generally unlawful. Exceptions are extremely limited and highly regulated; these may include zoos, sanctuaries, veterinary care, rehabilitation, scientific and educational activities, and the like. Only licensed falconers are permitted to possess, house, trap, transport, and use falconry raptors for the purpose of hunting or training.

In the current license year (2024) there are approximately 600 California licensed falconers, enjoying and showcasing the sport. The number of raptors in possession varies but has sometimes exceeded 1,000 birds in recent license years.

The purpose of the proposed amendments is to align current falconry regulations to conform with court orders deleting certain certification statements, abide by federal falconry regulations concerning examinations, and to clarify falconers' ability to exhibit their raptors.

#### **Economic Impact Statement**

##### **Section A. Estimated Private Sector Cost Impacts**

###### **Question 1. Answer g. Impacts individuals**

Federal falconry regulations require that a falconry applicant take an examination administered by the state in which they wish to obtain their license (Division 50, Code of Federal Regulations, Section 21.82(c)(3)). Presently, subsection 670(e)(3)(A)1 of Title 14, California Code of Regulations, allows applicants to take out-of-state falconry exams. The U.S Fish and Wildlife Service (USFWS) has notified California of this inconsistency with federal falconry regulations, potentially placing California's falconry program at risk of suspension.

The proposed regulation would require falconers to take the California-administered falconry examination for which the fee is currently \$69. Current regulations allow exams from other states for which the fee is reduced or non-existent. While this fee does not represent a new cost, and there are no additional fees required by this proposed regulation, this could represent an increase for those falconers who have completed their exams in other states.

## Section B. Estimated Costs

**Answer 1.** What are the total statewide dollar costs that businesses and individuals may incur to comply with this regulation over its lifetime?

Individuals taking the California falconry exam for the first time will need to pay the state's \$69 examination fee. This fee is not adjusted by these regulations and represents a cost that falconers already incur by complying with federal regulations regarding state falconry examinations. The fee may be considered a cost to individuals who would have taken the examination in other states where the fees may be less or non-existent.

Additionally, falconry examinations may only be taken in person at a testing facility administered by the Department. The Federal Highway Administration estimates <sup>1</sup>that the average mileage for a car is 24.4 miles per gallon, and the statewide average gas price is estimated to be \$4.85 per gallon as of February 19, 2025<sup>2</sup>. Assuming an applicant drives 40 miles to a testing facility and consumes roughly two gallons of gas, the indirect transportation cost for individuals is estimated to be \$9.70. Currently there are approximately 20 to 25 individuals who may decide to take the examination in state and who would be faced with these costs. Assuming that 25 applicants elect to pay the examination fee and incur the transportation costs, the average cost for individuals is \$78.70 with a combined cost of \$1,967.50.

## Section C. Estimated Benefits

**Answer 3.** What are the total statewide benefits from the regulation over its lifetime?  
\$2,212,812 annually

USFWS has notified California of its inconsistency with federal falconry regulations, which potentially places California's falconry program at risk of suspension. The Department's license data indicates that approximately 596 falconers purchased or renewed a license in 2024 (note: 2024 licensing data has not been finalized and there may be an increase as those final tallies are completed). If the Department's falconry program were de-certified by USFWS, existing falconers would lose the authority to possess their falconry raptors and use their raptors as a means of take.

The USFWS's 2022 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation<sup>3</sup> estimated that a hunter spends approximately \$3,264 (\$3,688.02 adjusted for 2025 dollars) in a season. Trip-related expenditure items include food, drink, refreshments, lodging, public and private transportation, airfare, charter, guide, package, and pack trips, public and private land use, heating and cooking fuel, equipment rental, and boating expenses. The survey does not include distinctions for different types of hunting practices, so for the purposes of this analysis we assume that falconers have the same seasonal spending pattern. Assuming the number of falconers is at least 600 individuals based on incomplete license data for 2024 and applying the \$3,688.02 per spender figure from the USFWS's 2022 survey yields an annual value of approximately \$2,212,812 for recreational hunter spending.

<sup>1</sup> Federal Highway Administration. Highway Statistics 2021, Table VM-1.

<sup>2</sup> AAA Fuel Prices

<sup>3</sup> 2022 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation | FWS.gov

## **Section D. Alternatives to the Regulation**

**Answer 1.** List alternatives considered and describe them below. If no alternatives were considered, explain why not:

No alternatives were identified by or brought to the attention of staff that would have the same desired regulatory effect.

Not amending the regulations would leave the Department out of conformity with the opinion issued by the U.S. Court of Appeals, 9th Circuit, in the case *Stavrianoudakis et al. v. United States Fish & Wildlife Service et al.* ((2024) 108 F.4th 1128)), leaving the Department vulnerable to further litigation and additional costs.

Not making the other proposed changes (i.e., allowing applicants to continue to take out-of-state exams) would place the Department's licensing authority at risk of suspension because it would continue to be inconsistent with federal falconry laws.

## **Fiscal Impact Statement**

### **Section A. Fiscal Effect on Local Government**

**Answer 5.** No Fiscal impact exists. This regulation does not affect any local entity or program.

### **Section B. Fiscal Impact on State Government**

**Answer 4.** Other.

This regulation does not affect any state agency or program outside of the Department and does not create any new duties or requirements for Department staff that are outside of their existing duties. The proposed regulations may save the Department hundreds of thousands of dollars in attorney's fees in the ongoing falconry litigation by deleting the certification language and, thereby, eliminating the remaining issues in the case related to conformity with the opinion issued by the United States Court of Appeal, 9th Circuit, in the case *Stavrianoudakis et al. v. United States Fish & Wildlife Service et al.* ((2024) 108 F.4th 1128)). The lawsuit, filed over six years ago, is ongoing; to date, the Department has paid approximately \$457,131 in attorney fees (\$282,131 to the California Department of Justice and \$175,000 in plaintiff's attorney fees) to defend the Department; the proposed regulatory amendments could end the lawsuit, minimize further payment of fees, and allow Department staff to work on other priorities.

The Department anticipates that an estimated 20 to 25 falconry applicants may start to take the California-administered Falconry examination, as the proposed regulations conform to federal regulations that prevent falconers from taking tests administered by other states where the cost may be lower. Under the current \$69 fee for the California falconry examination, this could net the Department anywhere between \$1,380 and \$1,725 in additional fee revenue.

In combination, the collection of additional fee revenue (assuming 25 applicants pay the examination fee) and the savings from not having to pay up to \$457,131 in additional attorney fees yields a fiscal benefit of approximately \$458,856 for the Department.

### **Section C. Fiscal Effect on Federal Funding of State Programs**

**Answer 3.** No fiscal impact exists. This regulation does not affect any federally funded State agency or program.

## Memorandum

**Date:** May 30, 2025

**To:** Melissa Miller-Henson  
Executive Director  
Fish and Game Commission

**From:** Charlton H. Bonham  
Director

**Subject:** **Public Comment Response and Pre-Adopt Memorandum for Proposed Amendments to Sections 670 and 703, Falconry Regulations and Forms (Agenda Item for the June 11-12, 2025, Fish and Game Commission Meeting)**

The Department of Fish and Wildlife (Department) has prepared this memorandum in response to comments received regarding proposed amendments to Sections 670 and 703, Falconry Regulations and Forms, Title 14, California Code of Regulations, to make certain provisions of the Falconry regulations conform with court orders regarding certain Certification statements, abide by federal Falconry regulations concerning examinations, and to clarify falconers' ability to exhibit their raptors. The Department has summarized and prepared responses to these comments in Attachment 1 and does not recommend making any changes to the proposed rulemaking.

If you have any questions regarding this matter, please contact David Kiene, Office of General Counsel. For the purpose of the memorandum and responses to comments, inquiries should be directed to [regulations@wildlife.ca.gov](mailto:regulations@wildlife.ca.gov).

cc: Chad Dibble, Deputy Director  
Wildlife and Fisheries Division

Scott Gardner, Branch Chief  
Wildlife Branch

Matt Meshriy, Upland/Small Game Biologist  
Wildlife Branch

David Kiene, Attorney IV  
Office of General Counsel

Xao Yang, Staff Services Manager  
License and Revenue Branch

Robert Pelzman, Assistant Chief  
Law Enforcement Division

Megan Cisneros, Lieutenant (Spec)  
Law Enforcement Division

Ona Alminas, Env. Program Manager  
Regulations Unit

Melissa Miller-Henson, Executive Director  
Fish and Game Commission  
May 30, 2025  
Page 2

Mike Randall, Regulations Analyst  
Regulations Unit

Dixie Van Allen, SSML, Regs Program Manager.  
Fish and Wildlife Commission

Ari Cornman, Wildlife Advisor  
Fish and Game Commission

Jenn Bacon, CESA Analyst  
Fish and Wildlife Commission



**670 Falconry** - Department Responses to Public Comments During the Notice Period and Hearings.

	<b>Commentor Name, Affiliation, Format, Date</b>	<b>Comment</b>	<b>Response</b>
1	Thomas Stephan <a href="#">Email 05/06/2025</a>	<p>1-a. Signing a certification relinquishing constitutional rights is coercion.</p> <p>1-b. Wardens seized his birds without a warrant in 2011, costing him business opportunities.</p> <p>1-c. California is not a legitimate governmental entity and threatens to take legal action on that basis.</p>	<p>1-a. Comment noted. A proposed amendment would permanently delete this portion of the certification.</p> <p>1-b. Comment noted. However, this comment is not directly related to the substance of the proposed regulation.</p> <p>1-c. Comment noted. However, this comment is not directly related to the substance of the proposed regulation.</p>
2	Thomas Stephan <a href="#">Email 05/09/2025</a>	<p>2-a. Forcing citizens to obtain a falconry license is null and void under the U.S. Constitution.</p> <p>2-b. Someone refusing to sign away 4<sup>th</sup> Amendment rights to obtain falconry license may lose their property.</p> <p>2-c. It is illegal to force citizens to obtain licenses.</p>	<p>2-a. Comment noted. However, this comment is not directly related to the substance of the proposed regulation.</p> <p>2-b. Comment noted. A proposed amendment would permanently delete this portion of the certification.</p> <p>2-c. Comment noted. However, this comment is not directly related to the substance of the proposed regulation.</p>
3	Thomas Stephan <a href="#">Email 05/14/2025</a>	<p>3-a. Provided a summary of the history of the United States and claims that California is not a legitimate governmental entity and all of its employees and officers lack standing; he does not consent to what he views as coercion by an illegitimate government; declares laws of the U.S. void, including the Migratory Bird Treaty Act.</p> <p>3-b. Forcing someone to sign away 4<sup>th</sup> Amendment rights to obtain a falconry license is illegal.</p>	<p>3-a. Comment noted. However, it is not directly related to the substance of the proposed regulation.</p> <p>3-b. Comment noted. A proposed amendment would permanently delete this portion of the certification.</p> <p>3-c. Comment noted. However, this comment is not directly related to the substance of the proposed regulation.</p> <p>3-d. Comment noted. However, this comment is not directly related to the substance of the proposed regulation.</p>

**670 Falconry** - Department Responses to Public Comments During the Notice Period and Hearings.

	<b>Commentor Name, Affiliation, Format, Date</b>	<b>Comment</b>	<b>Response</b>
		<p>3-c. Requiring citizens to obtain falconry licenses and pay fees is illegal.</p> <p>3-d. Recites experience as a falconer.</p>	
4	<p>Karl Kerster</p> <p>Oral Comment at Commission Meeting 05/14/2025; <a href="#">Email exhibit, submitted 05/14/2025</a></p>	<p>4-a. Suggest tabling/amending regulation proposal because it won't achieve goals.</p> <p>4-b. Disputes that federal regulations do not allow applicants to take out-of-state examinations; claims exhibit he provided shows that the Federal Falconry Coordinator explained that there is no Federal requirement that applicants must take in-state examinations.</p> <p>4-c. Falconry examination contains errors and does not comply with A.D.A.</p> <p>4-d. Prohibiting out of state exams will make California out of compliance by not having reciprocity with other states.</p>	<p>4-a. The Commission disagrees that this regulation proposal will not achieve its stated goals.</p> <p>4-b. The Commission disagrees. Federal regulations require a person who wishes to obtain an Apprentice license to "correctly answer at least 80 percent of the questions on an examination administered by the State...under which you wish to obtain a falconry permit." (50 C.F.R. 21.82(c)(3) and (4)(ii).) There is no Federal provision allowing an applicant to take an examination from a different state. Similarly, nowhere in the exhibit does the Federal Falconry Coordinator state that an applicant could take an examination from another state.</p> <p>4-c. Comment noted. However, this comment is not directly related to the substance of the proposed regulation.</p> <p>4-d. The Commission disagrees that this regulation proposal will make the State of California out of compliance with any reciprocity agreement requirement.</p>
5	<p>Peter Stavrianoudakis</p> <p>Oral Comment at Commission Meeting 05/14/2025</p>	<p>5-a. Objects to provision in falconry regulations allowing the Department to conduct unannounced inspections (14 C.C.R., section 670(j)(3)(A)).</p> <p>5-b. Department's claim that changing unannounced inspection regulation would result in the elimination of falconry regulations because it would conflict with</p>	<p>5-a. Comment noted. However, the unannounced inspection provision is not directly related to the substance of the proposed regulation.</p> <p>5-b. The unannounced inspection provision is not directly related to the substance of the proposed regulation. With respect to the proposed amendments to the exhibiting provision (14 C.C.R., section 670(h)(13)(A)), these amendments will make this provision consistent with language in this regulation the Department is no longer enforcing pursuant to a November 22, 2022 court order in</p>

**670 Falconry** - Department Responses to Public Comments During the Notice Period and Hearings.

	<b>Commentor Name, Affiliation, Format, Date</b>	<b>Comment</b>	<b>Response</b>
		<p>Federal regulations is false because the Department is also proposing amending regulations addressing exhibiting that would deviate from Federal regulations.</p> <p>5-c. Proposed regulation amending certification provision will not eliminate ongoing lawsuit because it would not address the central issue, i.e., the presence of the unannounced inspection provision in the falconry regulations, which the 9<sup>th</sup> Circuit Court of Appeal found “offensive”. Failure to address this issue is “cowardly.”</p> <p>5-d. The Department could obtain a search warrant instead of surprising falconers with unannounced inspections.</p>	<p>an ongoing lawsuit against the Department. The United States Fish and Wildlife Service, which administers the Federal falconry program, signed a stipulation in which the Department agreed to not enforce these provisions; this stipulation later became the basis of this court order.</p> <p>5-c The Commission disagrees. The 9<sup>th</sup> Circuit Court of Appeal expressly disfavored license certification provisions requiring falconry license applicants to sign a certification on their applications stating that they 1) understand their facilities, equipment, or raptors are subject to unannounced inspections, and 2) have read, understand, and agree to abide by the applicable provisions of the Fish and Game Code and regulations promulgated thereto, because these provisions are unconstitutional conditions. Deleting this provision should resolve this issue and help conclude the lawsuit. The Court did not rule on the constitutionality of the unannounced inspection provision, and instead dismissed plaintiff’s unannounced inspection claim for lack of standing</p> <p>5-d. Comment noted. However, this comment is not directly related to the substance of the proposed regulation.</p>
6	Doug Alton Oral Comment at Commission Meeting 05/14/2025	6-a. Opposes inclusion of unannounced inspection provision in the falconry regulation; the unannounced inspection provision has limited support; and authority for California regulations come from Federal regulations, and in turn, authority for Federal regulations comes from the Migratory Bird Treaty Act, which requires officers to obtain search warrants before conducting inspections.	6-a. Comment noted. However, this comment is not directly related to the substance of the proposed regulation.

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Stephan Comment 1

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**From:** Tom Stephan <[imdujour1@gmail.com](mailto:imdujour1@gmail.com)>  
**Sent:** Tuesday, May 6, 2025 06:04 AM  
**To:** FGC <[FGC@fgc.ca.gov](mailto:FGC@fgc.ca.gov)>  
**Subject:** Quo Warranto.

To: CDFG Commission.  
From: Thomas Stephan, former California licensed falconer.

In order to obtain a falconry license in California, the applicant must pay a fee and allow themselves to sign away their 4th Amendment rights.

No state or federal agency may turn a right into a privilege in order to charge a fee, MARBURY vs. MADISON 1803.

Many years ago, the California Dept. of Fish and Game forced me into signing away my 4th Amendment rights to be a falconer. This is coercion. Coercion is protected against by the 16th, the anti slavery Amendment.

Over a decade ago, 2011 as I recall, men with guns from this department, came onto my property four times without a warrant. As my Constitutional rights are "Unalienable". I can't have a lien put on them, no matter what I may or may not have signed.

These men who ostensibly took an oath to DEFEND the Constitution FOR the United States, seized my raptors "in place" at 5:25 p.m. on Christmas Eve. Then, piled mental much anguish on me for approximately the next six months, ultimately removing them on my birthday, June 29 while I was away at work. It was 107° that day. The birds barely survived. I never saw any of my precious hawks and falcons that I loved again. I have been without raptors here ever since.

At the time, I had a thriving falconry based bird control company, as seen on Animal Planet and National Geographic television channels. My raptor progeny was used in my company's contracts for the USAF and it's contractors- Lockheed Martin, Northrup Grumman, Boeing and many others in the private sector. The other progeny were sold to fellow falconers.

By seizing them, then removing my raptors in order to take my falconry license away, this department has deprived me of over a decade of income, totalling many hundreds of thousands of dollars.

Lately it has come to my attention that this "State of California" a "government agency" is actually a franchise under a US government corporation (15a.) <https://www.law.cornell.edu/uscode/text/28/3002>.

When an employee aka, an agency of WE THE PEOPLE vacates their position as government, then enters into commerce, that agency loses it's standing as a legitimate government agency because it no longer serves We The People but serves only its shareholders.

This potentially changes all that been foisted upon me in the past. As such, I no longer presume that the "State of California" is a legitimate government agency. As it looks to me today, by popular vote on November 8th, 1960, the "State of California" lost its charter.

I wish for this Commission to prove to me it's legitimacy by showing me where in the 1872 Bear Flag Republic is its charter, which allows it to operate as a legitimate government agency.

I will be available at the next Commission meeting in the event any of the commissioners want to discuss this item which is not in the docket yet. If they decline to discuss these issues on such short notice, I wish to be put on the docket for the next Commission meeting.

If blocked from that meeting, I will serve the Dept a writ of Quo Warranto.

In Liberty, Thomas N. Stephan.

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**From:** Tom Stephan <imdujour1@gmail.com>  
**Sent:** Friday, May 9, 2025 7:44 AM  
**To:** FGC <FGC@fgc.ca.gov>; Tom Stephan <tom@air-superiority.com>  
**Subject:** AB Initio.

To: California Fish and Game Commission.  
From.: Thomas Stephan.

Subject : AB INITIO. Falconry license requirement.

Forcing an applicant to require a falconry license is void AB INITIO as it doesn't exist, it never occurred because it only applies to contracts with franchises i.e. the "State of California" a franchise under the USA inc. (15a) <https://www.law.cornell.edu/uscode/text/28/3002>

We the people are not required to prove an analogy.

This franchise status is lacking full disclosure, making the contract null and void. Forced licensing makes the contract null and void as well, as it violates Constitutional law, the Supreme Law.

If an applicant refuses to sign away his 4th amendment rights to obtain a falconry license, he is denied the ability to house raptors, raptors that belong to him/ her as all the resources of this state and nation belong to We The People.

Forcing an sovereign American is coercion. Any participation in coercion lacks true content because it strips away fundamental rights, making the requirement void AB INITIO. In other words it's VOID, non contestable and non existent in all law, Land, Air and Water law.

The sovereign American and free Californian under the 1849 Republic, does not beg the agent, the "State of California" as we are the authority.

Declaration: I do not consent to compelled servitude under color of law. Further, I assert any contract obtained under threat or coercion is a loss of rights and is now void AB INITIO.

The "State of California" must now show the People their lawful authority jurisdiction and voluntary consent without invoking legal fictions.

Constitutional law reads that which is void does not require rebuttal, only repudiation. This repudiation is hereby declared.

This is a notice of revocation of non consent of servitude and jurisdiction. Unchallenged and rebutted point for point with full liability for peonage, in the 13th Amendment, is admission.

Forced licensing requirements reduce individuals to economic and political slaves, violating the 13th Amendment which abolished involuntary servitude and thr principal of self determination.

If I cannot exercise rights without submitting to a system that makes me a commodity, I'm forced into a system of statutory bondage. Any compelled contract is a void AB INITIO because I am a living man, not a legal fiction.

Thank you, Thomas N. Stephan.

5/14/2025

To: The California Dept. of Fish and Game Commission.  
From: Thomas Stephan'.  
Subject: Falconry License, Ab Initio.

The Organic Act of 1871 set aside the Founder's Common Law aka "law of the Land and Soil", usurping it with the Bank of London's British sea commerce banking law aka "statute law" (think attorneys passing the B.A.R. or the "British Accredited Registry").

At that time our nation became a corporation with the passage of the Organic Act of 1871. (15a.) 28 USC 3002. They never disclosed the change. Without full and honest disclosure, this contract was/is null and void.

In 1879, the Constitution FOR The United States of America was then rewritten to read Constitution OF the United States, now it is no longer a rule book for the government but for We The People! This was and still is a foreign invasion / hostile takeover at best. We are at war domestically. At that time, all the states, counties and cities became subsidiaries of the federal corporation, even Republics like the former "Bear Flag Republic" for California, a free and independent state.

The state of the "state of California" is an affiliate franchise which was created through the federal corporation's 1879 State of California Constitution. This new document set aside the Bear Flag Republic. This fraudulent state of the "state of California" government is masquerading as a legitimate government even today. The creation of offices outside of the original Republic was an ULTRA VIRES act, acting in excess of delegated power and authority. This is the one and the same State government here today.

The requirement for a falconry license is void, Ab Initio because contracts signed under duress or coercion are agreements made without full disclosure or consent, are null and void. It is as if the contract never happened. Any arrangement that violates Supreme Law, the Constitution for the United States of America is ab Initio. Dead on arrival.

Changing a right, falconry, into a privilege, falconry license, in order to charge a fee is a violation of the Marbury vs. Madison case, 1803. Charging a fee for a falconry license is a forced licensing scheme. Any attempt by a De Facto government is an attempt to coerce an applicant into signing into a contract that lacks standing.

The forced signing away of a California falconers 4th Amendment right to protection from unlawful warrantless search and seizure is criminal violation by those who took an oath to DEFEND the Constitution and is in itself, a criminal violation. There are three elements to an oath. Rarely in modern times are they uttered in full sequence and correct diction. One has to wonder how these persons become bonded.

Coercion is slavery and is protected against by the 13th, the Anti-Slavery Amendment. Coercion forces participation into a contract that lacks true consent and strips fundamental rights. The contract for a falconry license is currently a void contract and is Ab Initio, nonexistent in Common Law.

We The People are the body sovereign. We are free. I am free. We do not beg the agent, the State, for permission.

STATEMENT: I do not consent to being compelled by the De Facto state government to Servitude under Color of Law. I assert any contract obtained under threat, coercion or loss of rights is void Ab Initio as is the state licensing requirement for falconry.

Charging a fee to issue a privilege infringes on the People's Rights in Common law to own property, in this case, our raptors. Our time and money are our property. All the resources of our country belong to We The People, raptors included.



You, the state of the “state of California”, heretofore known as the “franchise”, must now show lawful authority jurisdiction and voluntary consent without the invocation of legal fictions, i.e. names in all caps, fraudulent undisclosed birth trusts, Citizens named as CITIZEN debt slaves via the 14th Amendment. Because the USA inc. is a for-profit corporation serving a board with profit and not representing We the People, all of its acts are nullified, including the Migratory Bird Treaty, the MBTA.

Notice of revocation: If no lawful authority is proven by you and or all listed points are not rebutted, a writ of Quo Warranto will follow. We are free men and women living on the land and soil of this once great nation, not in a British ship full of land pirates.

My birds, my home, my credit and nest egg savings were the sum of my life's work. I am now a financially broken due to Department of Fish and Game corruption and seizure.

The loss of income made it unable for me to pay property taxes. A lien was then put on my home. Due to the loss of income from the loss of my birds and subsequent loss of my bird control contracts, I lost my home. I would have paid off the mortgage in another two years. It was appraised at the time of default for \$650,000.

My wife and I suffered emotionally and tragically from this hostile takeover from the franchise. I loved my birds. Some were arctic in lineage. The wardens seized my raptors “in place” at 5:25 p.m. Christmas Eve and came back 6 months later on my birthday to crate them for transport while I was at work. It was 107 degrees that June 29th, the day they chased them around with nets. They were in terrible condition and as a result, nearly dead the recipient told me. What a cruel thing to do to innocent animals just to “teach me a lesson”.

Even my wife was traumatized by the unlawful seizure. “Snitch” our national champion racing Jack Russel terrier was kicked and injured her spine. She was never the same and never raced again. The Supreme court and the U.S. Constitution reads, “That which is void does not require rebuttal, simply repudiation”.

Affidavit of status: The revocation of consent to servitude and jurisdiction stands as unchallenged facts unless rebutted point for point, under oath and full liability.

Peonage 18 USC1590, protected us with fines and imprisonment for any persons that force coercion. Forced licensing requirement schemes functionally reduce individuals to economic and political slaves, violating the 13th Amendment which abolished involuntary servitude.

The principle of self-determination dictates that if We The People cannot exercise our rights without submitting to a system that commodifies us, we are in a state of STATUTORY bondage. This nation belongs to We The People. This federal and state of the “state government of California”, its departments, courts, judges, DA's, attorneys, politicians, senators, some sheriffs, governors, counselors, clerks, mayors, county and state commissioners and wardens lack standing. All have participated in the deception, exploitation and the destruction of the people that you/ they are supposed to serve.

The tide is turning. Previously vacant California counties are almost all now reinhabited under the original 1849 California Republic Constitution. The Founder's Common law is soon to make its triumphant return. The time remaining for this corporate corruption is short indeed. The U.S. corporation is dead. President Trump bankrupted the phony corporation. All the corporation's assets are now in receivership, its buildings, its land, its minerals and wealth. We the debtors are now We the creditors. The United States Republic is restored.

The treasonous power once wielded to defraud and manipulate We The People is over. Most states are aware of this fact. You just have not become aware yet. But soon you will. The People are awake. The crimes of financial fraud, theft of property, judicial misconduct and political treachery are no longer hidden. Military oversight and tribunals are coming.

The system that protected federal and state fraud is being dismantled. Soon there will be nowhere to hide. The time of corruption is over.

Let Freedom Ring.

Thomas N. Stephan, former falconer.

**Subject:** RE: [EXTERNAL] RE: out of state residents taking falconry examination?

**From:** "Huetter, Melanie@Wildlife" <Melanie.Huetter@wildlife.ca.gov>

**Date:** 11/9/2021, 8:09 AM

**To:** "Pagel, Joel" <Joel\_Pagel@fws.gov>, "Rowe, Stacy A - DNR" <Stacy.Rowe@wisconsin.gov>, "Ruiz, Teresa X (DEC)" <Teresa.Ruiz@dec.ny.gov>, "Rivers, Naomi R - DNR" <naomi.rivers@wisconsin.gov>, "Battistone, Carie@Wildlife" <Carie.Battistone@wildlife.ca.gov>, "George, Brent@Wildlife" <Brent.George@wildlife.ca.gov>

Good morning all,

Jeep, thank you for starting this conversation. The sponsor who told this apprentice to take the Wisconsin online exam is known to have 20+ apprentices at a time, and has a history of trying to get around falconry regulations. If online exams are easily available, I expect every one of his apprentices to take their exam this way.

Thank you,

Melanie Huetter  
License and Revenue Branch, Special Permits  
California Department of Fish and Wildlife  
P.O. Box 944209  
Sacramento, CA 94244-2090  
Phone: (916) 928-5849

From: Pagel, Joel <Joel\_Pagel@fws.gov>

Sent: Tuesday, November 9, 2021 8:03 AM

To: Rowe, Stacy A - DNR <Stacy.Rowe@wisconsin.gov>; Ruiz, Teresa X (DEC) <Teresa.Ruiz@dec.ny.gov>; Rivers, Naomi R - DNR <naomi.rivers@wisconsin.gov>; Huetter, Melanie@Wildlife <Melanie.Huetter@wildlife.ca.gov>; Battistone, Carie@Wildlife <Carie.Battistone@wildlife.ca.gov>

Subject: Re: [EXTERNAL] RE: out of state residents taking falconry examination?

Stacy,

Yes, the person with the CA phone number is potentially one of the people in question... Not sure if it is a one time thing; that is why I posed the question; something for us all to think about though. The federal regs state:

Taking a Test to qualify for a falconry permit. Before you are issued an Apprentice permit you must correctly answer at least 80 percent of the questions on

an examination administered by the \_\_\_\_\_, tribe, or territory under which you wish to obtain a \_\_\_\_\_ permit. The examination must cover care and handling of \_\_\_\_\_ raptors, Federal, \_\_\_\_\_ or territorial, and tribal (if applicable) laws and regulations relevant to \_\_\_\_\_, and other appropriate subject matter. Contact your \_\_\_\_\_, tribal, or territorial agency that regulates \_\_\_\_\_ for information about permits and taking the test.

Thanks Stacy!!

Joel E. (jeep) Pagel, Ph.D.

Raptor Ecologist

National Raptor Program

Division of Migratory Bird Management

U.S. Fish and Wildlife Service

505.850.4721 (govt. cellphone; central time zone)

*"It's not enough to understand the natural world, the point is to defend and preserve it." E. Abbey*

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From: Rowe, Stacy A - DNR <\_\_\_\_\_>

Sent: Tuesday, November 9, 2021 9:56

To: Ruiz, Teresa X (DEC) <\_\_\_\_\_>

>; Pagel, Joel <\_\_\_\_\_>

>; Rivers, Naomi R - DNR

<\_\_\_\_\_>; Huetter, Melanie@Wildlife <\_\_\_\_\_>

>; Battistone,

Carie@Wildlife <\_\_\_\_\_>

Subject: [EXTERNAL] RE: out of state residents taking falconry examination?

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Wow jeep, this is timely. I just had a falconer take their exam yesterday and then kept asking for a certificate of completion which we do not provide. What they do receive is an automatic email response with their results and a statement on whether they passed or failed. We do not require the test taker to be from WI, only to provide name, email, and phone. This person has a phone number from CA. This now makes me wonder if that should be a requirement although maybe this is a one time thing.

I personally am loving the warm weather but do agree that it's November already and needs to cool down!

We are committed to service excellence.

Visit our survey at \_\_\_\_\_

to evaluate how I did.

Stacy Rowe

Phone: 608-228-9796

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From: Ruiz, Teresa X (DEC) <\_\_\_\_\_>

>

Sent: Tuesday, November 09, 2021 9:53 AM

To: Pagel, Joel < >; Rivers, Naomi R - DNR < >; Huetter, Melanie@Wildlife < Carie@Wildlife < >

>; Rowe, Stacy A - DNR >; Battistone,

Subject: RE: out of state residents taking falconry examination?

**CAUTION: This email originated from outside the organization.**

**Do not click links or open attachments unless you recognize the sender and know the content is safe.**

Hi everyone,

We don't have a residency requirement here in NY- as a matter of fact, we allowed some CA residents to take the exam the first time that we put it online. However, only NY residents may apply for a NY falconry license.

For the first online exam last April, we had several CA residents take our exam. There was a small problem because CA required the individual's name and the date the exam was completed, and our pass screen did not provide that information. Our unit decided that for that exam only, we would provide verification letters for any non-resident that needed one, but it was not something we could take on for future exams. We did, however, update our pass screen to include that information so that examinees could simply provide a screenshot to their state's licensing office.

If this is creating an issue for other states, we're happy to discuss possible solutions.

Cheers,  
Teresa

~~~~~  
Teresa Ruiz (She/Her/Hers)  
Fish and Wildlife Technician 2  
Special Licenses Unit  
New York State Department of Environmental Conservation  
625 Broadway, Albany, NY 12233  
P: (518) 402-8985 | F: (518) 402-8925|



From: Pagel, Joel < >

Sent: Tuesday, November 9, 2021 10:40 AM

To: Rivers, Naomi R - DNR < >; Rowe, Stacy A - DNR < >; Ruiz, Teresa X (DEC) < >; Huetter, Melanie@Wildlife < Carie@Wildlife < >

>; Battistone,

Subject: out of state residents taking falconry examination?

Stacy, Teresa, and Naomi,

I have an interesting conversation going with the CA falconry administrators regarding CA residents taking out of state falconry tests (e.g. WI and NY), and using those tests AS proof of their knowledge, skills and abilities in falconry. Apparently an errant falconry sponsor is sending apprentice' out of state to get around the CA test.

My question to you (WI and NY); do you have any state residence requirement for taking your state falconry tests?

This is a new area for me, and has created a question that has many implications for all states; getting input from NY and WI early on as this situation develops would be very helpful to the CA falconry administrators.

Thanks in advance,

jeep

p.s. Naomi and Stacy; it got up to 67 degrees here in sturgeon bay yesterday; my 13 lined ground squirrel was up and about outside of her previously sealed hole.....what the heck!!!, I want winter!!!!

*Joel E. (jeep) Pagel, Ph.D.*

*Raptor Ecologist*

*National Raptor Program*

*Division of Migratory Bird Management*

*U.S. Fish and Wildlife Service*

*505.850.4721 (govt. cellphone; central time zone)*

*"It's not enough to understand the natural world, the point is to defend and preserve it." E. Abbey*

Staff Summary for April 16-17, 2025  
(*For background purposes only*)

## 14. Western Joshua Tree Conservation Plan

### Today's Item

Information ☒

Action ☐

Receive a summary of initial comments on and discuss the draft *Western Joshua Tree Conservation Plan*.

### Summary of Previous/Future Actions

- |                                                                                                                          |                          |
|--------------------------------------------------------------------------------------------------------------------------|--------------------------|
| • Determined that listing western Joshua tree under the California Endangered Species Act may be warranted               | September 2020           |
| • Public notice that western Joshua tree is protected as a candidate species under the California Endangered Species Act | October 2020             |
| • Received from Department the draft <i>Western Joshua Tree Conservation Plan</i>                                        | December 11-12, 2024     |
| • Discussed draft plan                                                                                                   | February 12-13, 2025     |
| • <b>Today receive update from the Department and discuss draft plan</b>                                                 | <b>April 16-17, 2025</b> |
| • Potentially take action on draft plan                                                                                  | June 18-19, 2025         |

### Background

At its September 2020 meeting, the Commission determined that listing western Joshua tree (WJT; *Yucca brevifolia*) under the California Endangered Species Act (CESA) may be warranted and accepted for consideration the petition submitted to list WJT as threatened or endangered. The Commission provided public notice of that decision; consequently, WJT is a candidate species under CESA.

In March 2022, the Department completed and made publicly available a status review report for WJT, as required under CESA. On July 10, 2023, the Governor signed the Western Joshua Tree Conservation Act, authorizing the Commission to postpone final consideration of the WJT CESA petition until the Department submits an updated status review, no later than January 1, 2033. Among other provisions, the act requires the Department to draft a conservation plan for WJT in collaboration with the Commission, governmental agencies, California Native American tribes, and the public. The plan must:

- incorporate a description of management actions necessary to conserve WJT and objective, measurable criteria to assess the effectiveness of such actions;
- include guidance for avoiding and minimizing impacts to WJT and protocols for the successful relocation of western Joshua trees; and
- include tribal co-management principles, provide for the relocation of western Joshua trees to tribal lands upon request from a tribe, and incorporate traditional ecological knowledge.

Staff Summary for April 16-17, 2025  
(*For background purposes only*)

The Department submitted a draft *Western Joshua Tree Conservation Plan* to the Commission (exhibits 1 and 2), which was publicly received at the Commission's December 2024 meeting. The act further stipulates that the Commission "shall take final action" on the plan by June 30, 2025, and that the Department and Commission periodically review and update the plan if necessary.

At the Commission's February 2025 meeting, the Department gave a presentation describing how the draft plan was developed and the contents of the draft plan and its appendices. The Commission received public comments on the draft plan and discussed elements of the plan, the process laid out in the act, and the next steps in revising the draft plan. During discussion, the Commission requested that the Department provide additional opportunities (i.e., workshop) for the public to engage with the Department on the plan.

### ***Today's Update***

Today, the Commission will receive a presentation from the Department providing a summary of the feedback received to date, the workshops and outreach since the last Commission meeting, and plan amendments the Department proposes (Exhibit 3). The Commission will also hear public comments and provide additional feedback on the draft plan, in anticipation of considering final action on the plan in June 2025. The Department has summarized anticipated changes based on prior comments (Exhibit 4).

### **Significant Public Comments**

1. Five scientists from the Ecology and Evolutionary Biology Department at the University of California Santa Cruz urge the Commission to consider comments and recommendations to the plan, including incorporating more realistic emissions scenarios, prioritizing areas with climatically suitable habitat loss, facilitating dispersal, increasing groundwater research, expanding the effectiveness criteria, and prioritizing recruitment and nurse trees (Exhibit 5).
2. The California Construction and Industrial Materials Association requests the Department's annual report assessing the conservation status of WJT, as required by California Fish and Game Code Section 1927.7, to be able to review the plan, and urges that the plan incorporate an accurate climate refugia map (Exhibit 6).
3. Preservation Ranch suggests some changes to the plan, including more specificity regarding climate refugia, greater emphasis on federal coordination, and increased transparency on the conservation fund and its coordination with other funding sources (Exhibit 7).
4. The Large-Scale Solar Association elaborates on concerns with buffer zones, seed collection, and tree relocation protocols, and requests more time for public engagement before the Commission acts on the plan (Exhibit 8).
5. Eight environmental organizations state that the plan will help fill knowledge gaps, contemplates the need for separate guidance for developed and undeveloped areas, and advocates for the siting of renewable energy projects to avoid impacts to habitats,

Staff Summary for April 16-17, 2025  
*(For background purposes only)*

The organizations generally agree with the determinations and management actions proposed in the plan (Exhibit 9).

6. The Mojave Desert Land Trust communicates its support for the plan and recounts its part in founding the Joshua Tree Conservation Coalition. The trust stresses the nonregulatory, collaborative, and voluntary nature of the plan (Exhibit 10).
7. A commenter submits a suggested process to allow more flexibility in certain aspects of WJT permitting, including California Environmental Quality Act compliance, impacts to tree roots (including in urban areas), tree censusing, mitigation, tree relocation, dead trees, and issuance timelines. The commenter includes a “Suggested Joshua Tree Permit Matrix” to illustrate some of these ideas (Exhibit 11).
8. Four commenters, including the Sierra Club’s California/Nevada Desert Committee, broadly support the plan, its goals, and its measures. One commenter includes a video demonstrating the variety of insects attracted by Joshua tree blooms, and another states that the fees charged for removing trees are too low to provide adequate protection (Exhibit 12).
9. Three commenters express concerns with the plan and WJT permitting, including the size of the ground disturbance avoidance buffer around trees, inhibiting the Yucca Valley sewer project and potentially preventing residents from connecting to the sewer line, and the amount of fees borne by homeowners (Exhibit 13).

## Recommendation (N/A)

## Exhibits

1. [Draft Western Joshua Tree Conservation Plan Volume 1](#), received November 22, 2024
2. [Draft Western Joshua Tree Conservation Plan Volume 2: Appendices](#), received November 22, 2024
3. [Department presentation](#)
4. [Summary of Changes to Western Joshua Tree Conservation Plan](#), received from Department on April 2, 2015
5. [Letter from five scientists at the University of California Santa Cruz](#), received April 2, 2025
6. [Letter from Adam Harper, Senior Director of Policy, California Construction and Industrial Materials Association](#), received April 1, 2025
7. [Letter from Heidi Brannon, Preservation Ranch](#), March 31, 2025
8. [Letter from Shannon Eddy, Executive Director, Large-Scale Solar Association](#), received April 3, 2025
9. [Letter from eight environmental non-governmental organizations](#), received April 3, 2025
10. [Email from Krystian Lahage, Mojave Desert Land Trust](#), received April 3, 2025
11. [Letter from Julie Gilbert](#), received April 3, 2025



Staff Summary for April 16-17, 2025  
(*For background purposes only*)

12. [Emails from four commenters.](#) received March 7, 2025 through April 3, 2025
13. [Emails from three commenters.](#) received March 9 through March 26, 2025

**Motion (N/A)**

State of California  
Department of Fish and Wildlife

## Memorandum

Date: May 27, 2025

To: Melissa Miller-Henson  
Executive Director  
Fish and Game Commission

From: Charlton H. Bonham  
Director



Subject: **Western Joshua Tree (*Yucca brevifolia*) Conservation Plan**

The California Department of Fish and Wildlife (Department) is providing the attached Draft Western Joshua Tree Conservation Plan (Conservation Plan) revision date June 2025, for the California Fish and Game Commission's (Commission) approval pursuant to the Western Joshua Tree Conservation Act, Fish and Game Code section 1927 et seq. This revised Conservation Plan is based on the best scientific information currently available to the Department and has been completed in collaboration with governmental agencies, California Native American Tribes, and the public (Fish & G. Code, § 1927.6, subd. (a)).

The revised Conservation Plan incorporates a description of management actions necessary to conserve the western Joshua tree, and objective, measurable criteria to assess the effectiveness of such actions. This revised Conservation Plan addresses comments provided by various governmental agencies, California Native American tribes, and the public. The Department has completed its submission requirements to the Commission.

If you have any questions or need additional information, please contact Ryan Mathis, Acting Branch Manager, Habitat Conservation Planning Branch at (916) 704-6177 or by email at [wj@wildlife.ca.gov](mailto:wjt@wildlife.ca.gov).

### Attachment

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CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

# Western Joshua Tree Conservation Plan



VOLUME I: WESTERN JOSHUA TREE CONSERVATION PLAN

Presented to the  
California Fish and Game Commission

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JUNE 2025



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# Western Joshua Tree Conservation Plan

JUNE 2025

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**Prepared for:**

California Fish and  
Game Commission



**Prepared by:**

California Department of  
Fish and Wildlife

**CONTACTS:**

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**With Assistance from**

Ascent Environmental, Inc. dba Ascent,  
ASM Affiliates, and Piñon Heritage Solutions

**Suggested citation:**

California Department of Fish and Wildlife (CDFW). 2025. Western Joshua Tree Conservation Plan. Presented to the California Fish and Game Commission, June 12, 2025.

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# TRIBAL RECOGNITION, LAND ACKNOWLEDGEMENT, AND CDFW ACTION COMMITMENT

The California Department of Fish and Wildlife (CDFW) recognizes that the lands we care for were originally and are still inhabited and cared for by California Native American tribes. We honor and pay respect to their elders and descendants — past, present, and emerging — as they continue their relationship with these lands. These Tribes continue to maintain their political sovereignty and cultural traditions as vital members of Joshua tree habitat. We acknowledge their tremendous contributions to the lands managed by CDFW and thank them for their ongoing stewardship. It is important to CDFW that we be inclusive of these contributions and provide the ability for Tribes to carry forward these traditional cultural teachings, reflecting our relationships and commitment to righting historical wrongs and bringing California Native American people back to the land to help in the restoration and healing of California.

CDFW recognizes the importance of taking action to support tribal values, traditions, and interests. The Western Joshua Tree Conservation Plan embodies the intent for action through co-management of western Joshua tree conservation with Tribes. Tribal co-management planning and strategies also incorporate Traditional Ecological Knowledge. CDFW is preparing the Conservation Plan in collaboration with California Native American tribes and the Native American Land Conservancy. Tribes participating in consultation with CDFW as of the date of publication of the Conservation Plan are listed in Section 3.1 and Appendix C. CDFW will continue ongoing consultation with Tribes to further refine actions based on tribal input and co-management participation in the conservation of western Joshua tree and its habitat.



## LIST OF ABBREVIATIONS

| Acronym or Abbreviation | Definition                                               |
|-------------------------|----------------------------------------------------------|
| A&M                     | avoidance and minimization                               |
| ACTCI                   | Agua Caliente Tribe of Cupeño Indians                    |
| BLM                     | US Bureau of Land Management                             |
| CAL FIRE                | California Department of Forestry and Fire Protection    |
| Cal-IPC                 | California Invasive Plant Council                        |
| Caltrans                | California Department of Transportation                  |
| CDCA                    | California Desert Conservation Area                      |
| CDFW                    | California Department of Fish and Wildlife               |
| CEQA                    | California Environmental Quality Act                     |
| CESA ITP                | California Endangered Species Act incidental take permit |
| CESA                    | California Endangered Species Act                        |
| CNRA                    | California Natural Resources Agency                      |
| Combat Center           | Marine Corps Air Ground Combat Center                    |
| Commission              | California Fish and Game Commission                      |
| Conservation Fund       | Western Joshua Tree Conservation Fund                    |
| Conservation Plan       | Western Joshua Tree Conservation Plan                    |
| CSLC                    | California State Lands Commission                        |
| CSP                     | California State Parks                                   |
| DOD                     | US Department of Defense                                 |
| DRECP                   | Desert Renewable Energy Conservation Plan                |
| DWR                     | California Department of Water Resources                 |
| EO                      | executive order                                          |
| EPA                     | US Environmental Protection Agency                       |
| ESA                     | Endangered Species Act                                   |
| E&A                     | education and awareness                                  |
| FTBMI                   | Fernandeño Tataviam Band of Mission Indians              |



## List of Abbreviations

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|                   |                                               |
|-------------------|-----------------------------------------------|
| GIS               | geographic information system                 |
| HCP               | habitat conservation plan                     |
| INRMP             | integrated natural resources management plan  |
| ITP               | incidental take permit                        |
| KVIC              | Kern Valley Indian Community                  |
| LC&M              | land conservation and management              |
| LUPA              | land use plan amendment                       |
| MDSL              | Mojave Desert Sentinel Landscape              |
| MIST              | minimum impact suppression techniques         |
| MOU               | memorandum of understanding                   |
| MSHCP             | multi-species habitat conservation plan       |
| NALC              | Native American Land Conservancy              |
| NASA              | National Aeronautics and Space Administration |
| NCCP              | Natural Community Conservation Plan           |
| NCCPA             | Natural Community Conservation Planning Act   |
| NEPA              | National Environmental Policy Act             |
| NFWF              | National Fish and Wildlife Foundation         |
| NGO               | non-governmental organization                 |
| NPS               | National Park Service                         |
| NWCG              | National Wildfire Coordinating Group          |
| OHV               | off-highway vehicles                          |
| RCIS              | Regional Conservation Investment Strategies   |
| Ripley State Park | Arthur B. Ripley Desert Woodland State Park   |
| R&I               | research and information                      |
| sq km             | square kilometer                              |
| sq mi             | square miles                                  |
| SVRA              | State vehicular recreation area               |
| SWAP              | State Wildlife Action Plan                    |
| TCM               | Tribal co-management                          |



|           |                                                        |
|-----------|--------------------------------------------------------|
| TEK       | Traditional Ecological Knowledge                       |
| THPO      | Tribal historic preservation officer                   |
| TPBMI     | Twenty-Nine Palms Band of Mission Indians              |
| Tribes    | California Native American tribes                      |
| USFS      | US Forest Service                                      |
| USFWS     | US Fish and Wildlife Service                           |
| USGS      | US Geological Survey                                   |
| WCB       | California Wildlife Conservation Board                 |
| WHPP      | wildlife habitat protection plan                       |
| WJTCA ITP | Western Joshua Conservation Act incidental take permit |
| WJTCA     | Western Joshua Tree Conservation Act                   |





## FOREWORD



Western Joshua trees are beloved members of California's spectacular biodiversity. They are emblematic of Mojave Desert vegetation and Native American tribes have nurtured and coexisted with Joshua trees since time immemorial. Their spiky silhouettes have long captivated our interest, and their survival in desert ecosystems is a testament to life's ability to adapt. But western Joshua trees are facing an increasing variety and intensity of threats. Climate change, habitat loss, and wildland fire are the primary threats to western Joshua tree and represent significant challenges for us to overcome.

With this Western Joshua Tree Conservation Plan, we hope to lay the groundwork for long-term conservation of the species and the desert ecosystems on which it depends. Our conservation work will depend on science including Traditional Ecological Knowledge, principles of tribal co-management, and collaboration to succeed. Conservation of western Joshua tree will not be easy, but I believe that we can do it through dedicated partnerships with California Native American tribes, agencies, and other organizations, and by embracing the western Joshua tree management actions and strategies outlined in this plan.

I'm proud of the California Department of Fish and Wildlife's work in preparing this plan and of the many collaborative partnerships we've forged in its preparation. I look forward to continuing our western Joshua tree conservation efforts in the future.

**Charlton H. Bonham**  
CDFW Director



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## 1 INTRODUCTION

Western Joshua tree (*Yucca brevifolia*) is an iconic plant species with substantial ecological and cultural importance in California. The California Fish and Game Commission (Commission) made western Joshua tree a candidate for listing as a threatened species under the California Endangered Species Act (CESA) in September 2020. As a result, western Joshua tree now benefits from the protections afforded by CESA (discussed in Section 1.1.2). In addition, the Western Joshua Tree Conservation Act (WJTCA) was passed and signed into law in July 2023 to conserve western Joshua tree and its habitat. WJTCA requires the California Department of Fish and Wildlife (CDFW) to develop and implement a Western Joshua Tree Conservation Plan (Conservation Plan) in collaboration with the Commission, governmental agencies, California Native American tribes (Tribes), and the public (Fish & G. Code, § 1927.6, subd. (a)). CDFW developed the Conservation Plan based on the best available information, consisting of "credible science" as defined in the California Fish and Game Code section 33, including Traditional Ecological Knowledge (TEK); collaboration with California Native American tribes; collaboration with federal, state, and local government agencies; and public feedback. This chapter provides an overview of the need for western Joshua tree conservation, the vision and objectives of the Conservation Plan, CDFW's collaboration with other entities in developing the Conservation Plan, and the Conservation Plan organization.

The Conservation Plan provides guidelines for western Joshua tree conservation, criteria to help define effectiveness of management actions, monitoring of management outcomes, and a process of adaptive management to refine and improve the management actions over time. Western Joshua tree conservation will require action from many different people, governments, and organizations. The management actions in the Conservation Plan can be voluntarily adopted and implemented by project proponents, land managers, and

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*"Joshua tree forests tell a story of survival, resilience, and beauty borne through perseverance."*

*- Jane Rodgers, Superintendent, Joshua Tree National Park.*

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philanthropists to help conserve and protect the species from harm. California Native American tribes and the State can work together to co-manage conservation consistent with the Conservation Plan's guidance. The management actions can be incorporated into project approvals by local, state, and federal government agencies that authorize projects or resource management programs in western Joshua tree's range in California. Researchers can implement management actions related to research and private citizens and other organizations can implement actions related to education and awareness. While statutory sections from WJTCA are referenced where relevant, the Conservation Plan does not create new statutory or regulatory mandates.

WJTCA states that CDFW and the Commission "shall, if necessary, periodically update the conservation plan to ensure the conservation of the species" (Fish & G. Code, § 1927.6. subd. (a)) after the Commission approves an initial Conservation Plan. In addition, the Commission shall consider recommendations from CDFW for Conservation Plan amendments "beginning in 2026, and at least every two years thereafter" (Fish & G. Code, §1927.8 subd. (a)). As such, the Conservation Plan is designed to be a living document that will be modified over time to effectively conserve western Joshua tree. Section 6.8, "Monitoring, Species Status Reviews, Plan Amendment, and Adaptive Management," describes the process for evaluating management outcomes and amending the Conservation Plan.

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**Western Joshua Tree Conservation Act** is the law that regulates take of western Joshua tree and mandates the permitting process. It also requires CDFW to develop and implement a Conservation Plan in collaboration with the Commission, governmental agencies, California Native American tribes, and the public.

The **Western Joshua Tree Conservation Plan** provides voluntary guidelines and management actions that will conserve the species – there are no regulations in the Conservation Plan.

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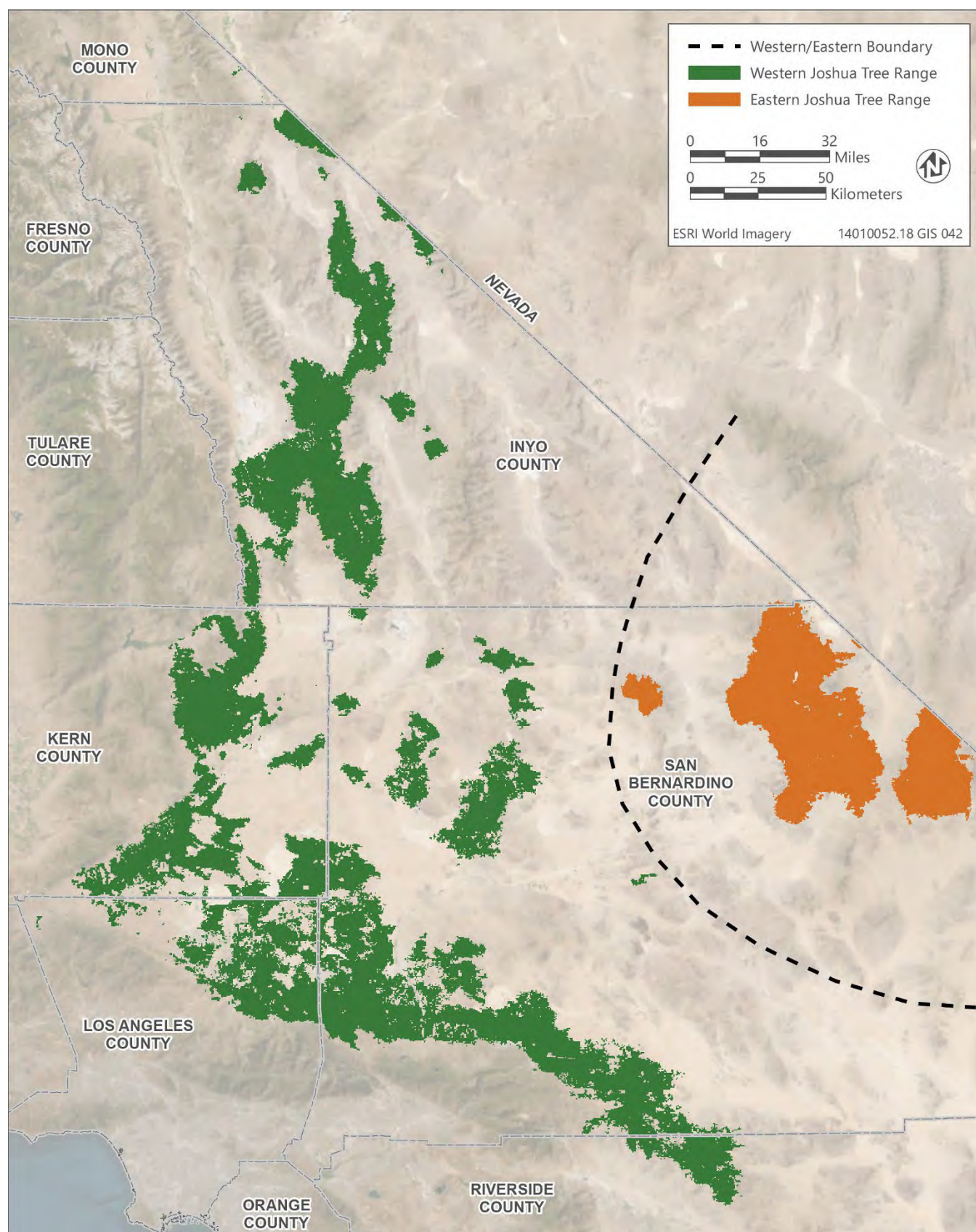
## 1.1 NEED FOR WESTERN JOSHUA TREE CONSERVATION

### 1.1.1 Summary Description of Western Joshua Tree

Western Joshua tree is one of two species of Joshua tree; the second species is eastern Joshua tree (*Yucca jaegeriana*) (Figure 1-1). Although eastern Joshua tree is noted in some instances in the Conservation Plan, western Joshua tree is the only species protected by and subject to CESA, WJTCA, and the guidance provided in the Conservation Plan. For the purposes of the Conservation Plan, the term "Joshua tree" means both western Joshua tree and eastern Joshua tree collectively, or it may be used when the information presented is not known to be specific to one of the two species.







Source: Esque et al. 2023; adapted by Ascent in 2024.

Figure 1-1 Western and Eastern Joshua Tree Range in California



Western Joshua tree is an important part of California's desert ecosystem and provides habitat for numerous birds, mammals, insects, reptiles, and other organisms. Western Joshua tree also possesses considerable cultural value for California Native American tribes, many of which use the species to make traditional tools and products and for culinary and medicinal purposes (Louderback et al. 2013; Sutton and Earle 2017). In addition, silhouettes of Joshua trees carry cultural significance for many Tribes (FTBMI, pers. comm., 2024).

In California, western Joshua tree is found within the Mojave Desert, parts of the Great Basin, and in transition zones within the southern Sierra Nevada and Southern California mountains bordering those areas, where precipitation levels are low and vary between wetter and drier conditions annually and over multiyear and multidecade timescales. Western Joshua tree is currently relatively widespread and abundant throughout this range, grows slowly, and may require approximately 50 to 70 years to reach reproductive maturity and begin producing flowers. The species is reliant on its sole obligate pollinator, the yucca moth (*Tegeticula synthetica*), to produce seeds, and on scatter-hoarding rodents to disperse and cache seeds at a soil depth suitable for germination. Joshua tree seedlings may establish most successfully after large mast seeding events. Mast seeding is the production of many seeds by many individuals of a species at the same time and in the same region. Joshua tree mast seeding events currently occur at an average frequency of more than once every 4 years (Yoder et al. 2024). Presence under a nurse plant (i.e., a plant that facilitates the growth and development of other plant species beneath its canopy) and several successive years of sufficiently wet and cool conditions are likely required for successful seedling establishment and sufficient growth for western Joshua trees to withstand drier and hotter conditions. Western Joshua tree is also capable of asexual growth, which may allow individuals to survive in marginal climate conditions for long periods of time. Western Joshua tree ecology and threats to the species are described in detail in Chapter 4, "Summary of Resource Conditions."

The major threats to western Joshua tree include human activities, climate change, and wildland fire. The combined threats to western Joshua tree, coupled with the species' biology and specific habitat requirements, are causes for substantial concern about the ability of the western Joshua tree population to persist in California long-term. Without some level of direct management, the future of the species will largely depend on its ability to withstand continued habitat loss and to adapt to the hotter and drier conditions that are expected due to climate change. Therefore, thoughtful conservation actions and careful land management are needed to sustain and enhance the western Joshua tree population in California.

### 1.1.2 Background of the Western Joshua Tree Conservation Act

In October 2019, the Center for Biological Diversity submitted to the Commission a petition to list western Joshua tree as threatened under CESA. The petition identified climate change and





wildland fires as the greatest threats to the persistence of the species. It also included habitat loss due to development; seed and plant predation, especially during drought; and competition with invasive species as other factors affecting the species' ability to survive and reproduce (Center for Biological Diversity 2019).

The Commission found, based in part on CDFW's evaluation of the petition and related recommendation, that there was sufficient information indicating that listing the species as threatened under CESA may be warranted. The Commission designated western Joshua tree a candidate species in September 2020 (CDFW 2022), conferring upon western Joshua tree temporary legal protection under CESA.

CDFW evaluated the petition and submitted a written status review report to the Commission in March 2022 (CDFW 2022). The report concluded that western Joshua tree is not likely to be in danger of becoming extinct throughout all, or a significant portion, of its range in the foreseeable future in the absence of special protection and management efforts required by CESA. In June 2022, the Commission considered the status review report and could not reach a decision regarding whether listing the species as threatened was warranted. In February 2023, while the Commission was still considering its final decision on the petition, legislation was introduced to protect western Joshua tree. In response to the legislative proposal, the Commission postponed further consideration of the petition under CESA.



Source: National Park Service.

In July 2023, the California State Legislature passed and the governor signed into law WJTCA, codifying as Chapter 11.5 of Division 2 of the California Fish and Game Code (commencing with Fish & G. Code, § 1927). WJTCA does the following:

- Provides protections for western Joshua tree by prohibiting the import, export, take, possession, purchase, or sale of any western Joshua tree in California (Fish & G. Code, § 1927.2, subd. (a)). Pursuant to Fish and Game Code Section 86, "take" means "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."
- Allows CDFW to authorize take of western Joshua tree if certain conditions are met (Fish & G. Code, § 1927.3, subds. (a)-(b)).



- Authorizes CDFW to enter into a written agreement with any county or city to delegate to the county or city limited authority to authorize take of western Joshua tree if specified conditions are met (Fish & G. Code, § 1927.3, subd. (c)).
- Allows CDFW to authorize, by issuing permits, the removal or trimming of dead western Joshua trees or the trimming of live western Joshua trees that pose a risk to structures or public health and safety if certain conditions are met. (Fish & G. Code, § 1927.4, subd. (a)).
- Authorizes CDFW to enter into a written agreement with any county or city to delegate to the county or city limited authority to authorize the removal or trimming of dead western Joshua trees or the trimming of live western Joshua trees that pose a risk to structures or public health and safety if specified conditions are met (Fish & G. Code, § 1927.4, subd. (b)–(c)).
- Allows permittees to elect to pay specified fees in lieu of completing mitigation obligations (Fish & G. Code, § 1927.3, subd. (a)(3)).
- Establishes the Western Joshua Tree Conservation Fund (Conservation Fund). Any monies in the fund will be continuously appropriated to CDFW solely for the purposes of acquiring, conserving, and managing conservation lands and completing other activities to conserve western Joshua tree. (Fish & G. Code, § 1927.5, subd. (a)).
- Directs CDFW to develop and implement a conservation plan for western Joshua tree in collaboration with the Commission, other governmental agencies, California Native American tribes, and the public. (Fish & G. Code, § 1927.6, subd. (a)). CDFW must consult with California Native American tribes and include co-management principles (Fish & G. Code, § 1927.6, subd. (b)). CDFW must present the draft Conservation Plan at a public meeting of the Commission no later than December 31, 2024, and WJTCA calls for the Commission to take final action on the plan by June 30, 2025. (Fish & G. Code, § 1927.6, subd. (a)).
- Directs CDFW to submit an annual report assessing the conservation status of western Joshua tree to the Commission and the State Legislature by January 31 of each year, starting in 2025 (Fish & G. Code, §1927.7, subd. (a)).
- Requires CDFW to submit to the Commission an updated status review report by January 1, 2033, unless the Commission directs CDFW to complete it sooner (Fish & G. Code, § 1927.2, subd. (c)(2)(F) & 1927.9). The Commission shall consider determining whether the petitioned action to list western Joshua tree under CESA is warranted (Fish & G. Code, §1927.9). In the interim, western Joshua tree is, and will remain, a candidate species under CESA.





## 1.2 CONSERVATION PLAN VISION, PURPOSE, AND OBJECTIVES

### 1.2.1 Vision

The vision of the Conservation Plan is to prevent the extinction of western Joshua tree in the wild, preserve functioning ecosystems that support western Joshua tree, and maintain sustainable populations of western Joshua tree in California over the long term, such that listing the species under CESA will not be warranted.

### 1.2.2 Purpose

The purpose of the Conservation Plan is to fulfill the requirements articulated in Fish and Game Code Section 1927.6. Upon approval by the Commission, the Conservation Plan will guide the conservation of western Joshua tree in California by focusing on the most urgent and important management actions, as informed by science including TEK; collaboration with California Native American tribes; collaboration with federal, state, and local government agencies; and public feedback.

### 1.2.3 Objectives

The following objectives are identified in WJTCA:

- Describe management actions necessary to conserve western Joshua tree and objective, measurable criteria to assess the effectiveness of such actions (Fish & G. Code, §1927.6, subd. (a)).
- Provide guidance for the avoidance and minimization of impacts to western Joshua trees (Fish & G. Code, § 1927.6, subd. (a)).
- Include in the Conservation Plan protocols for the successful relocation of western Joshua trees and provide for the relocation of western Joshua trees to tribal lands upon a request from a Tribe (Fish & G. Code, § 1927.6, subds. (a)-(b)).
- Include co-management principles and incorporate Traditional Ecological Knowledge into the Conservation Plan (Fish & G. Code, § 1927.6, subd. (b)).
- Prioritize actions and acquiring and managing lands that are identified as appropriate for western Joshua tree conservation (Fish & G. Code, § 1927.6, subd. (c)).

### 1.2.4 Geographic Focus Area

The Conservation Plan includes a geographic focus area for conservation activities encompassing 37,749 square kilometers (9,327,981 acres, or 14,575 square miles) in southeastern



California. It reflects the general location of currently occupied western Joshua tree habitat plus an 8-kilometer (5-mile) buffer in California to encompass areas that could be suitable for implementation of conservation management actions (Figure 1-2). However, application of WJTCA and implementation of the management actions described in the Conservation Plan (see Chapter 5, “Conservation Management Actions and Effectiveness Criteria”) are not limited to the geographic focus area. In addition, the geographic focus area may be modified through amendment of this Conservation Plan based on evolving information regarding current and future western Joshua tree habitat resulting from ongoing scientific analysis.

## 1.3 COLLABORATION, OUTREACH, AND PUBLIC REVIEW

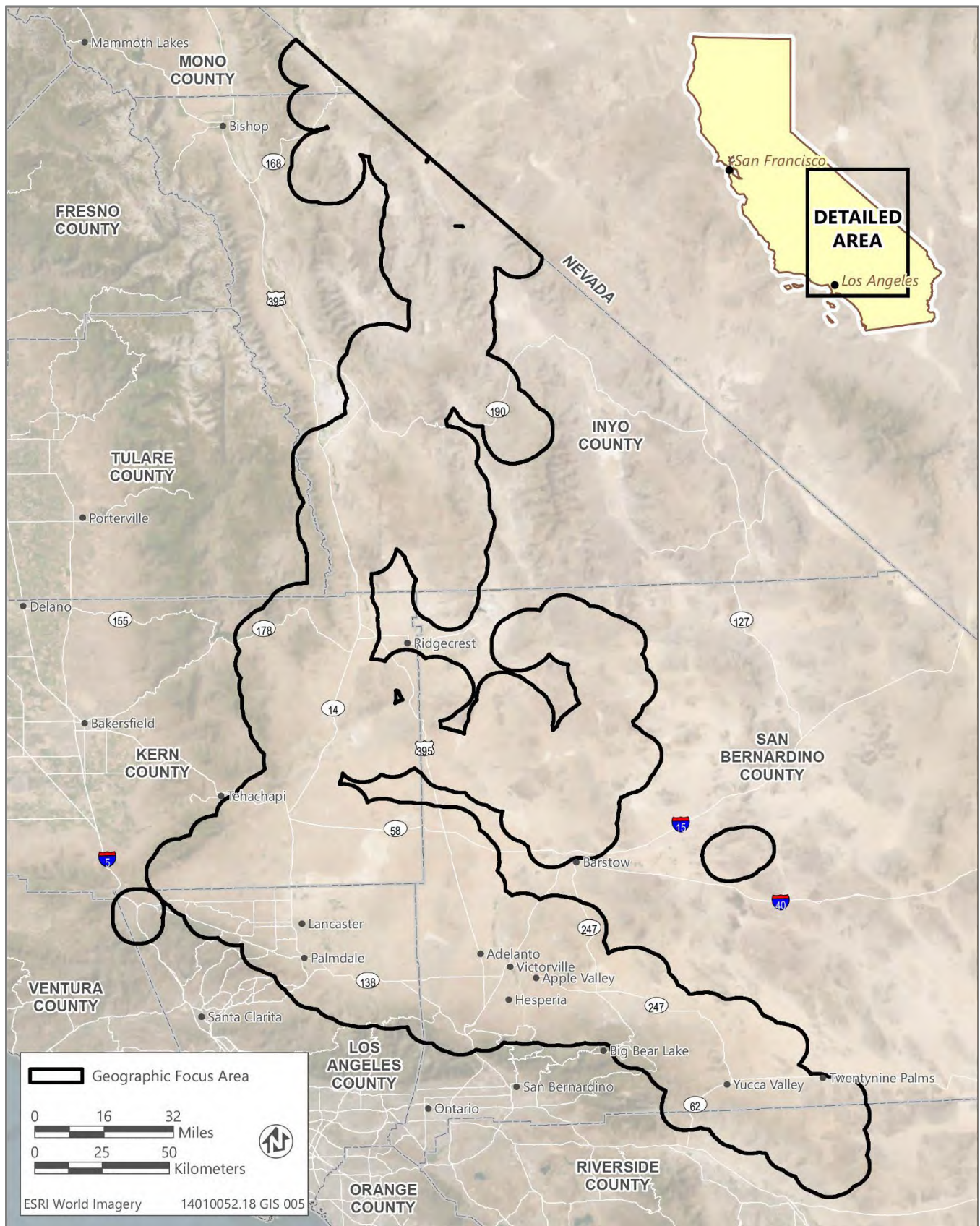
WJTCA requires CDFW to develop this Conservation Plan for western Joshua tree in collaboration with the Commission, governmental agencies, California Native American tribes, and the public (Fish & G. Code, §1927.6 subds. (a)–(b)). This collaboration has occurred throughout the development of the Conservation Plan via in-person and virtual consultation and outreach with Tribes; virtual meetings with federal, state, and local agencies and other interest groups; virtual meetings with the public; and correspondence with interested organizations and individuals.

Additional information on outreach, review, and public proceedings related to the approval of this Conservation Plan is available on the Commission’s website, including the process for public review of the draft Conservation Plan prior to final action.

### 1.3.1 Local, State, and Federal Government Agencies

CDFW conducted two rounds of virtual outreach meetings with local, state, and federal agencies that own, manage, or have jurisdiction over lands within the Conservation Plan’s geographic focus area (Figure 1-2). In the first round of meetings, CDFW provided an overview of WJTCA, an overview of the types of permits that may be issued under WJTCA authorizing take of western Joshua tree, and a summary of the Conservation Plan contents required under WJTCA. Meeting attendees had an opportunity to provide feedback on content that should be included in the Conservation Plan, information regarding the current management of western Joshua tree, and ways agencies might collaborate with CDFW in implementing management actions set forth in the Conservation Plan. In the second round of meetings, CDFW provided a summary of the management actions developed since the previous meetings and a description of the draft conservation “management units,” which aim to organize where specific management actions should be prioritized and implemented. Attendees were asked for input on additional management actions, details or issues that could be addressed in the Conservation Plan, and opportunities for collaboration with CDFW in implementing the Conservation Plan.





Source: Esque et al. 2023; adapted by Ascent in 2024.

**Figure 1-2 Geographic Focus Area**





After each round of outreach meetings, CDFW contacted the agencies that requested a follow-up meeting or failed to attend the group outreach meetings. Follow-up meetings focused on discussion of proposed management actions, recommendations, and potential issues with management action implementation (Table 1-1). They also included, where applicable, discussion of current western Joshua tree management activities on agency properties and the potential to incorporate those activities into a written memorandum of understanding (MOU) or other written agreement with CDFW. Email correspondence sent to staff from agencies that did not attend the outreach meetings included a link to the meeting recordings, PDF copies of the meeting presentations, and a questionnaire (see Appendix A, “Agency Feedback Questionnaire”) designed to help CDFW identify existing western Joshua tree management actions by asking for the following information:

- The agency’s current management of western Joshua tree or vegetation in general.
- The agency’s best management practices for wildland fire suppression or prevention, invasive species control, relocation of western Joshua tree, prevention of soil erosion, grazing, and off-highway vehicle (OHV) recreation within western Joshua tree habitat.
- Western Joshua tree-specific restoration/conservation efforts in the past, present, or future planning (e.g., seed collection/banking, replanting western Joshua tree, replanting/seeding native nurse plants for western Joshua tree, or western Joshua tree relocation).
- The description of existing agency collaborations or written agreements with local California Native American tribes, if any.

CDFW also sought input from agencies regarding potentially acceptable terms for a written MOU between federal, state, and local jurisdictions regarding western Joshua tree conservation. The questionnaire focused on the implementation of management actions recommended in this Conservation Plan (see Section 5.2, “Management Actions Necessary to Conserve Western Joshua Tree”). These and other potential written agreement terms are described in Section 6.3, “Collaboration.”

**Table 1-1 CDFW Agency Outreach Meetings and Meetings with Individual Agencies**

| Date              | Agency or Agencies                                               | Requested By |
|-------------------|------------------------------------------------------------------|--------------|
| February 29, 2024 | State and federal agencies                                       | CDFW         |
| February 29, 2024 | Local agencies                                                   | CDFW         |
| March 27, 2024    | California State Parks (CSP)                                     | CSP          |
| May 8, 2024       | CSP                                                              | CDFW         |
| May 15, 2024      | State and federal agencies                                       | CDFW         |
| May 15, 2024      | Local agencies                                                   | CDFW         |
| May 22, 2024      | California State Lands Commission                                | CDFW         |
| June 12, 2024     | CSP                                                              | CSP          |
| July 15, 2024     | California Department of Forestry and Fire Protection (CAL FIRE) | CAL FIRE     |

Source: Compiled by Ascent in 2024.



A full list of agencies invited to collaborate, including those that provided specific input for this version of the Conservation Plan, is in Appendix B, “Agency and Public Input Summary Memo.”

### 1.3.2 California Native American Tribes

Collaboration with Tribes and inclusion of tribal co-management principles are critical aspects of CDFW’s development of the Conservation Plan. At CDFW’s request, the Native American Heritage Commission provided a list of contacts for 170 federally and non-federally recognized Tribes culturally affiliated with the geographic focus area. CDFW sent email invitations to these Tribes to view an online presentation regarding the Conservation Plan and to participate in a related tribal listening session. CDFW also mailed hard-copy letters with the same information to the Tribes, then followed up via phone and email to ensure Tribes received notice of available opportunities to participate in the development of the Conservation Plan and to answer any questions. A summary of CDFW’s tribal engagement and collaboration process is described in Appendix C, “Tribal Input Summary Memo.”

The Native American Land Conservancy (NALC) secured grant funding from the California Wildlife Conservation Board (WCB) to reimburse Tribes for their time spent contributing to the development of the Conservation Plan, including travel costs incurred from participating in Conservation Plan meetings.



Source: Alessandra Puig-Santana, National Park Service.



In coordination with the Commission, CDFW prepared and mailed formal joint consultation invitation letters to notify Tribes of the development of the Conservation Plan and to request tribal input under CDFW's Tribal Communication and Consultation Policy and the Commission's Tribal Consultation Policy. CDFW emailed the tribal consultation letters to the tribal contacts from the Native American Heritage Commission list on February 22, 2024, and mailed hard copy letters on March 4, 2024. CDFW then called Tribes beginning on March 19, 2024, to describe three available meeting options: facilitated meetings led by NALC, informational meetings/tribal listening sessions with CDFW, and consultation with CDFW and/or the Commission. Facilitated meetings were conducted by NALC staff and funded by the WCB grant. All notes taken by NALC staff at meetings with Tribes were reviewed and approved by participating Tribes prior to their provision to CDFW to inform its development of the Conservation Plan. These meetings began on May 9, 2024, are ongoing, and may be requested at any time. The three meeting options are described below:

1. **Facilitated meetings** provide an opportunity for Tribes to engage in a closed, internal discussion with a facilitator. The goal of these meetings is for the facilitator to help organize thoughts and ideas to reach a mutual written agreement on what information shared by Tribes will be publicly disclosed and included in the draft Conservation Plan. CDFW does not participate in these meetings, and the meetings do not constitute government-to-government consultation. In these meetings, the facilitator provides background information to tribal representatives and allows for open discussion centered around the tribal community. The facilitator works with the Tribe to develop ideas, input, and recommendations to share with CDFW for potential incorporation into the Conservation Plan.
2. **Informational meetings** include CDFW and one or more Tribes. In informational meetings, CDFW informs Tribes about WJTC and the Conservation Plan and provides Tribes with an opportunity to ask questions and seek clarification. These meetings consist of a phone call or virtual meeting or tribal listening session that can include one or more tribal chairpersons, Tribal Historic Preservation Officers (THPOs), tribal representatives, and/or tribal members. An informational meeting is not considered to be consultation, as defined in CDFW policy.
3. **1:1 consultation**, as defined in CDFW's Tribal Communication and Consultation Policy, means the process of engaging in government-to-government dialogue with Tribes in a timely manner and in good faith to provide Tribes with necessary information and to seek out, discuss, and give full and meaningful consideration to the views of Tribes in an effort to reach a mutually agreed upon resolution of any concerns expressed by the Tribes or CDFW. CDFW acknowledges and respects that Tribes are unique and separate governments within the United States with inherent Tribal Sovereignty, including the rights to independence, self-governance, self-determination, and economic self-sufficiency. These principles form the basis for government-to-government consultations. Consultation may occur jointly or individually with CDFW or the Commission and a Tribe or one or more



designated representative(s) of the Tribe. A consultation may also include multiple Tribes, but each Tribe would need to agree. A Tribe may request consultation at any time. Consultation may be virtual or in-person at a location acceptable to the Tribe.

The Tribes that CDFW and NALC have met with thus far were invited to review and provide comments on a preliminary draft of this Conservation Plan and following CDFW's submittal of the draft Conservation Plan to the Commission. Tribes will have additional opportunities to review and provide input on an ongoing basis for future versions of the Conservation Plan (see Sections 6.4, "Tribal Co-Management," and Section 6.8). CDFW currently maintains a dedicated email address for communication with Tribes regarding the Conservation Plan: [WJT.TribalEngage@wildlife.ca.gov](mailto:WJT.TribalEngage@wildlife.ca.gov).

CDFW received feedback from tribal members that a meeting with multiple Tribes would be beneficial for Tribes to learn more about WJTCA and the Conservation Plan, and to share knowledge about western Joshua tree. Subsequently, two multi-tribe Western Joshua Tree Community Workshops were held. The workshops were intended to provide tribal communities an interactive space to access valuable information and resources about WJTCA and the Conservation Plan, to share information about the cultivation and preservation of western Joshua trees, and to assist in the development and implementation of the Conservation Plan. Tribes that had previously expressed interest in collaborating on the Conservation Plan were invited via email and phone to attend the workshops. The first workshop, sponsored by NALC and the Lone Pine Paiute-Shoshone Tribe, was held on October 26, 2024 in the town of Lone Pine. Sixteen Tribe members from seven Tribes attended the workshop. The second workshop was sponsored by CDFW and NALC and was held on two dates: February 21, 2025 in the community of Joshua Tree and February 22, 2025 in the town of Yucca Valley. Ten Tribe members from six Tribes attended. A full list of Tribes that attended each of the workshops is in Appendix C.

Tribal outreach and consultation are ongoing and will continue to inform updates to the Conservation Plan and to identify California Native American tribes' interested in engaging in co-management practices with CDFW and in receiving western Joshua trees relocated from other areas. Section 3.2, "Tribal Values Related to, and Uses of, Joshua Tree," discusses traditional tribal values and uses of western Joshua tree, and Section 3.3, "Traditional Ecological Knowledge for Conservation," describes Traditional Ecological Knowledge for conservation. Section 5.2.3, "Tribal Co-Management," identifies tribal co-management actions that were developed and will be implemented in coordination with California Native American tribes. Co-management principles will be guided by foundational commitments initially developed by CDFW and described in Appendix G, "Foundational Commitments by CDFW for Developing Western Joshua Tree Conservation Plan Co-Management Principles with California Native American Tribes." The foundational commitments may be refined in the future, in collaboration with Tribes co-managing western Joshua tree and its habitat.



### 1.3.3 Public

CDFW initially engaged with the public by launching a website dedicated to the Conservation Plan on November 22, 2023. The website includes an email address, [WJT@wildlife.ca.gov](mailto:WJT@wildlife.ca.gov), through which the public can share suggestions, ask questions, and provide feedback. The website also provided the public with notices of two virtual outreach meetings held on April 4 and July 11, 2024 and two virtual workshops on March 10, 2025. Invitations to the 2024 meetings and the 2025 workshops were distributed to subscribers of “CDFW News” and “CDFW western Joshua tree updates” topics through the California Department of General Services public email subscription service between 14 and 30 days prior to the meetings. Coinciding with the timing and content of the 2024 scheduled public meetings, CDFW also held focused meetings with researchers and other interested organizations.

CDFW also emailed the July 2024 public meeting invitation directly to individuals representing communities and organizations working in environmental justice within the Conservation Plan geographic focus area. CDFW sent emails to individuals and organizations that are connected to communities that have been excluded from environmental policy-setting and/or decision-making. These emails were intended to initiate meaningful engagement and to bridge the gap between underserved communities and environmental conversations that affect them most by providing the opportunity to provide input on the Conservation Plan.

As with the government agency meetings, during the first public meeting, CDFW provided an overview of WJTCA, an overview of the types of permits authorizing take of western Joshua tree, and a summary of the Conservation Plan content. In an open forum, meeting attendees had an opportunity to provide feedback, ask questions, and raise issues or concerns they would like to see addressed in the Conservation Plan. Attendees were also encouraged to submit written comments about the Conservation Plan summary to the [WJT@wildlife.ca.gov](mailto:WJT@wildlife.ca.gov) email address by April 30, 2024. During the second meeting, CDFW provided a summary of the management actions and a description of the management units where the management actions would be implemented and presented some mechanisms for implementing the management actions. CDFW also addressed previous questions and concerns posed by the public during and following the first public meeting. In the March 10, 2025 workshops, CDFW provided an overview of WJTCA provisions, permits required for impacts to western Joshua tree under WJTCA, an overview of the Conservation Plan, and a summary of the comments received and anticipated changes to the draft changes to the draft Conservation Plan since its first release to the public on November 27, 2024.

Meeting invitees and attendees included property owners, real estate brokers, trade association representatives, nonprofit land conservancy and conservation association representatives, leaders in the environmental justice community, town council association





representatives, regulatory consultants, biologists, local agency staff, and legislative office representatives. A summary of input received during the meetings is provided in Appendix B.

Additional information on public proceedings related to the approval of this Conservation Plan is available on the Commission's website. In addition, the public may continue to provide input to CDFW and the Commission on the Conservation Plan to inform periodic updates (see Section 6.8).

### 1.4 ORGANIZATION OF THE CONSERVATION PLAN

The Conservation Plan describes the steps required to achieve the vision of conserving western Joshua tree and its habitat in California such that listing under CESA will not be needed. The Conservation Plan can be divided into two parts: The first part summarizes guiding concepts and currently available information, and the second part describes management actions and the implementation approach for conserving western Joshua tree and achieving the vision of the Conservation Plan. The chapters of the Conservation Plan are briefly described under the following two parts of the Conservation Plan:

#### Guiding Concepts and Information Needed for Conservation

- Chapter 1, "Introduction," summarizes the western Joshua tree conservation need; identifies the vision, purpose, and objectives of the Conservation Plan; and describes the collaboration process for Conservation Plan development.
- Chapter 2, "Planning Influences," describes existing regulations, policies, and planning initiatives that influence management actions. Identifying planning influences affecting the Conservation Plan facilitates collaboration and helps efficiently determine conservation opportunities.
- Chapter 3, "Traditional Values and Uses of Western Joshua Tree by California Native American Tribes," focuses on the tribal values and uses of western Joshua tree and TEK that influenced the persistence of the species and its habitat over millennia. The information in this chapter is designed to inform the co-management activities that would be co-created by CDFW and participating California Native American tribes.



*Joshua tree seeds.*

*Source: Sarinah Simmons, National Park Service.*



- Chapter 4, “Summary of Resource Conditions,” presents information on the ecology of western Joshua tree; the ecosystem it inhabits; its past, current, and potential range; and environmental stressors and threats that have affected and will affect the persistence of the species. This chapter also identifies gaps in current knowledge needed to inform effective conservation.

### Conservation Management Actions and Implementation Mechanisms

- Chapter 5, “Conservation Management Actions and Effectiveness Criteria,” as informed by the information in Chapters 1 through 4, describes the intended use of management actions as guidance for conservation; the specific management actions necessary to conserve western Joshua tree; where specific management actions should be prioritized based on areas of predicted climate refugia, habitat conservation value, existing land use type, and ownership designation within the species’ range; and criteria for measuring the effectiveness of those actions.
- Chapter 6, “Implementation,” outlines the mechanisms established to implement the Conservation Plan management actions presented in Chapter 5, as well as the roles and responsibilities of the implementing parties. The chapter identifies potential types of written agreements with collaborators, the permitting framework described in WJTCA, Conservation Fund management, land acquisition procedures, the annual reports documenting permitting and mitigation performance metrics (Fish & G. Code, § 1927.7, subd. (a)), and the process for updating and amending the Conservation Plan.

## 1.5 WESTERN JOSHUA TREE CONSERVATION ADAPTIVE MANAGEMENT FRAMEWORK

To be effective, the Conservation Plan must be able to address near-term threats to the species and preserve existing western Joshua trees and their habitat on the site-specific scale while gathering the additional information needed to enact range-wide conservation in the long term. To achieve this, the Conservation Plan is designed to be implemented in an adaptive management framework within the broader context of WJTCA. An adaptive management framework provides a structured process that allows for management actions, closely monitoring and evaluating outcomes, and reevaluating and adjusting decisions as more information is learned. The adaptive management framework for western Joshua tree conservation has five conceptual phases, which are illustrated in Figure 1-3, “Western Joshua Tree Conservation Adaptive Management Framework,” and described below.

### 1. Prepare the Draft Plan

Preparation of the draft Conservation Plan is the first phase in the framework. The Conservation Plan describes existing resource conditions, California Native American tribes’ values, western Joshua tree conservation needs, collaborators in achieving the



conservation vision, and guidance for management actions with implementation mechanisms.

### **2. Public Review and Plan Approval**

The Conservation Plan and any updates to it in the future are circulated for public review, presented at a public meeting, and formally approved by the Commission. This public process will allow public agencies, interested parties, and California Native American tribes to provide input on the Conservation Plan prior to approval by the Commission.

### **3. Implement the Conservation Plan**

Once the Conservation Plan is approved, the conservation management actions will be implemented through continued collaboration between CDFW and local, state, and federal agencies by establishing interagency written agreements or written memoranda of understanding and by developing co-management written agreements and written memoranda of understanding with tribal collaborators. CDFW will monitor conservation management actions that have been implemented, including those in progress since the species' candidacy for listing under CESA, and others that have been developed specifically in response to WJTCA and the western Joshua tree population condition.

### **4. Evaluate the Plan Results**

CDFW will gather and evaluate new knowledge from the scientific community, agencies, and Tribes needed to achieve or improve effectiveness of management actions. As new information is incorporated into management actions, CDFW will monitor the outcome on western Joshua tree conservation status, as measured by the effectiveness criteria presented in Section 5.3, "Effectiveness Criteria."

### **5. Share the Results and Adjust Plan Components**

CDFW will report on the performance of the permitting and mitigation program and provide an assessment of the conservation status of western Joshua tree in annual reporting, described in Section 6.8.1, "Monitoring and Reporting," and required by WJTCA (Fish & G. Code, § 1927.7, subd. (a)). Management actions will be adjusted based on new scientific and other information, effectiveness of management actions, permit and mitigation performance, and ongoing feedback from collaborators. Through adaptive management, strategy refinements, and new information will be incorporated into the Conservation Plan (Fish & G. Code, § 1927.6, subd. (a)). CDFW will also recommend Conservation Plan amendments to the Commission every 2 years at a public meeting, as necessary (Fish & G. Code, § 1927.8, subd. (a)). Through this process, management actions and implementation mechanisms may be adjusted to improve conservation of western Joshua tree and achieve the vision of this Conservation Plan.



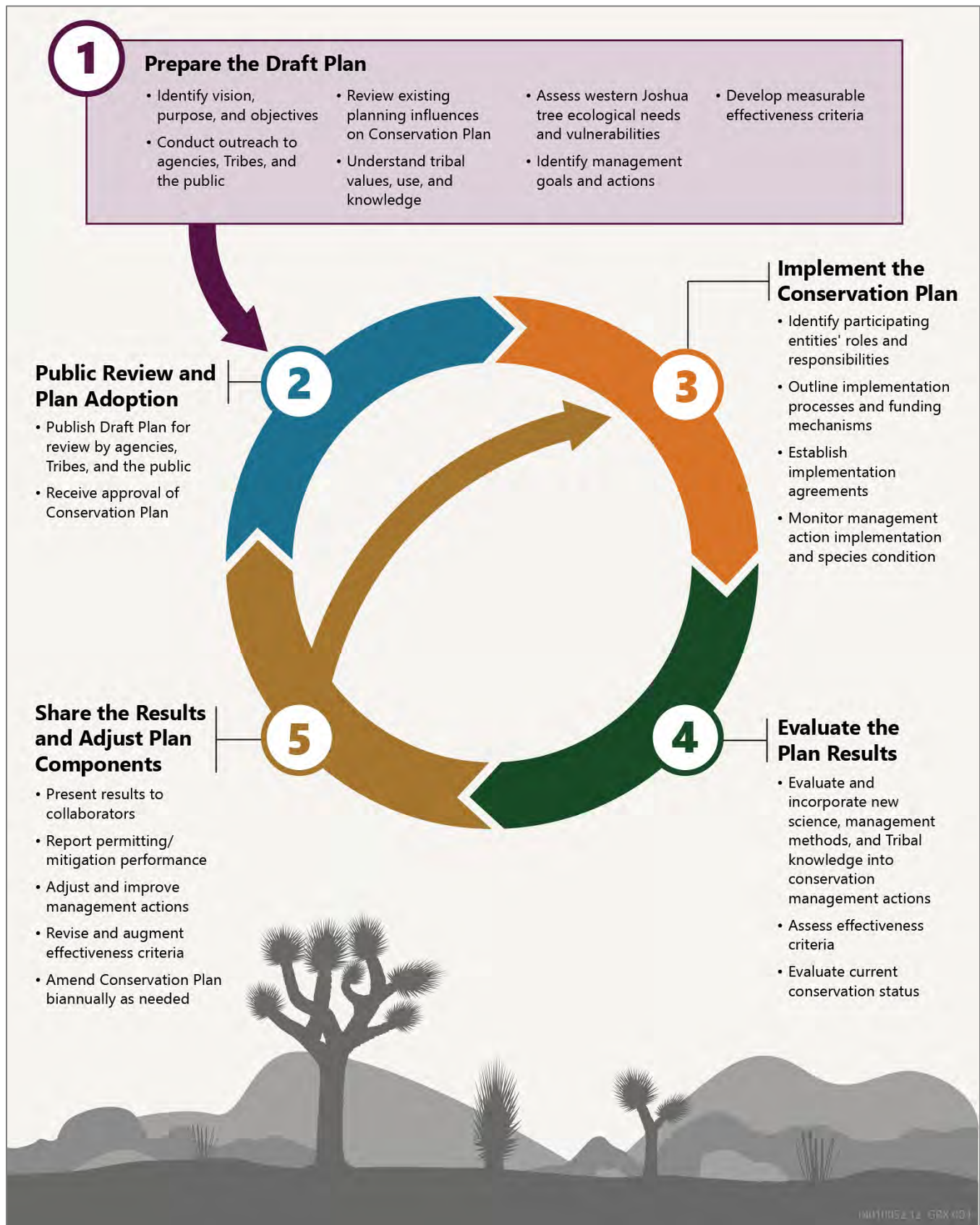


Figure 1-3 Western Joshua Tree Conservation Adaptive Management Framework







## 2 PLANNING INFLUENCES

Science including Traditional Ecological Knowledge (TEK) forms the foundation of conservation strategies for western Joshua tree. The planning, policy, and statutory/regulatory context of the geographic focus area also helps guide the management actions. This chapter summarizes existing federal, state, and local plans, as well as adopted policies, legislation, regulations, and ordinances related to western Joshua tree and discusses how they influence the Conservation Plan.

Because western Joshua tree's range is in multiple jurisdictions and under varying land ownership, successful implementation of range-wide conservation strategies will require coordinated efforts between landowners, the public, nongovernmental organizations (NGOs), government agencies, and California Native American tribes (Tribes). Using species distribution modeling data, Table 2-1 summarizes the area and percent of western Joshua tree's total range in California that is on federal, state, local government, and private lands. Figure 2-1 provides a graphic representation of land ownership within the Conservation Plan geographic focus area. Western Joshua tree's range is described further in Section 4.1.1, "Range and Distribution." These species distribution modeling data (Esque et al. 2023) are used throughout this chapter and the Conservation Plan, and represent the presence of western Joshua trees within 0.25-square-kilometer grid cells (approximately 62 acres) but do not provide information on the number or density of trees within these grid cells.

Tribal lands, as referenced in Fish and Game Code section 1927.6, subdivision (b), include lands meeting the definition of "Indian country" in 18 US Code section 1151 held in trust by Tribes (rancherias/reservations) or tribal members (individual allotments usually within rancherias/reservations); fee lands held by Tribes (land purchased and owned by a Tribe typically outside of rancherias/reservations); or fee lands held by tribally led NGOs (e.g., the Native American Land Conservancy [NALC]) or NGOs formed by non-federally recognized Tribes to act on the Tribe's behalf as a vehicle to hold land. However, because complete



mapping for these other categories is not available, other than lands held in trust by Tribes (approximately 4 square kilometers [1.5 square miles] mapped by the Bureau of Indian Affairs), tribal lands are not included in Figure 2-1. Coordination with Tribes will continue to confirm the amount and location of tribal lands for incorporation into future Conservation Plan updates.

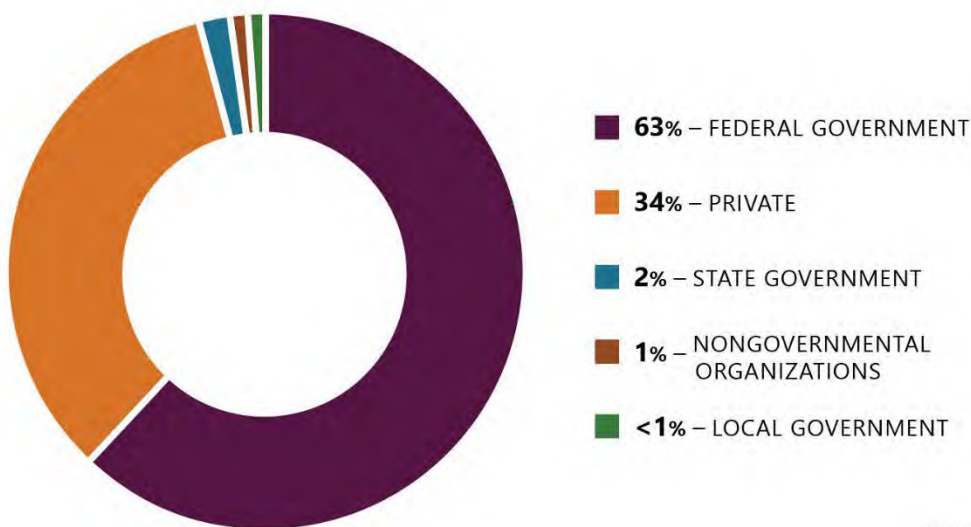
**Table 2-1 Land Ownership in Western Joshua Tree Range in California**

| Entity <sup>1</sup>                        | Area in Square Kilometers (sq mi) | Percent of California Range (%) |
|--------------------------------------------|-----------------------------------|---------------------------------|
| <b>Federal (Total)</b>                     | <b>8,207 (3,168.7)</b>            | <b>63</b>                       |
| US Bureau of Land Management               | 3,703 (1,429.9)                   | 28                              |
| US Department of Defense                   | 2,321 (896.3)                     | 18                              |
| National Park Service                      | 1,934 (746.5)                     | 15                              |
| US Forest Service                          | 245 (94.6)                        | 2                               |
| Bureau of Indian Affairs                   | 4 (1.5)                           | <1                              |
| Natural Resources Conservation Service     | 0.3 (0.1)                         | <1                              |
| <b>Private, NGOs, Local (Total)</b>        | <b>4,608 (1,779.2)</b>            | <b>35</b>                       |
| Private Land                               | 4,470 (1,726.0)                   | 34                              |
| Nongovernmental Organizations (NGOs)       | 104 (40.5)                        | 1                               |
| Local Government                           | 34 (13.0)                         | <1                              |
| <b>State (Total)</b>                       | <b>272 (104.9)</b>                | <b>2</b>                        |
| California State Parks                     | 149 (57.4)                        | 1                               |
| California State Lands Commission          | 87 (33.7)                         | 1                               |
| California Department of Fish and Wildlife | 34 (13.2)                         | <1                              |
| Other State lands                          | 2 (0.6)                           | <1                              |

Notes: sq mi = square miles.

<sup>1</sup> Lands in all ownership categories include lands held as easements for which the landowner is not disclosed.

Source: Esque et al. 2023; compiled by Ascent in 2024 and 2025.



Source: Created by Ascent in 2024.

**Figure 2-1 Land Ownership within the Western Joshua Tree Range in California**



Figure 2-2 shows the land within the geographic focus area owned by the federal government, state government, local government, NGOs, and private entities. As explained in Section 1.2.4, “Geographic Focus Area,” the geographic focus area is currently occupied western Joshua tree habitat plus an 8-kilometer (5-mile) buffer within California to encompass areas that could be suitable for implementation of conservation management actions.

## 2.1 WESTERN JOSHUA TREE CONSERVATION ACT REQUIREMENTS

Statutory requirements for the Conservation Plan are set forth in Western Joshua Tree Conservation Act (WJTCA), which is codified at Fish and Game Code section 1927 et seq. The legal status of western Joshua tree under state and federal law also influences conservation planning. The following discussion summarizes key requirements of WJTCA relevant to the Conservation Plan and the current legal protection status of the species.

### 2.1.1 Conservation Plan

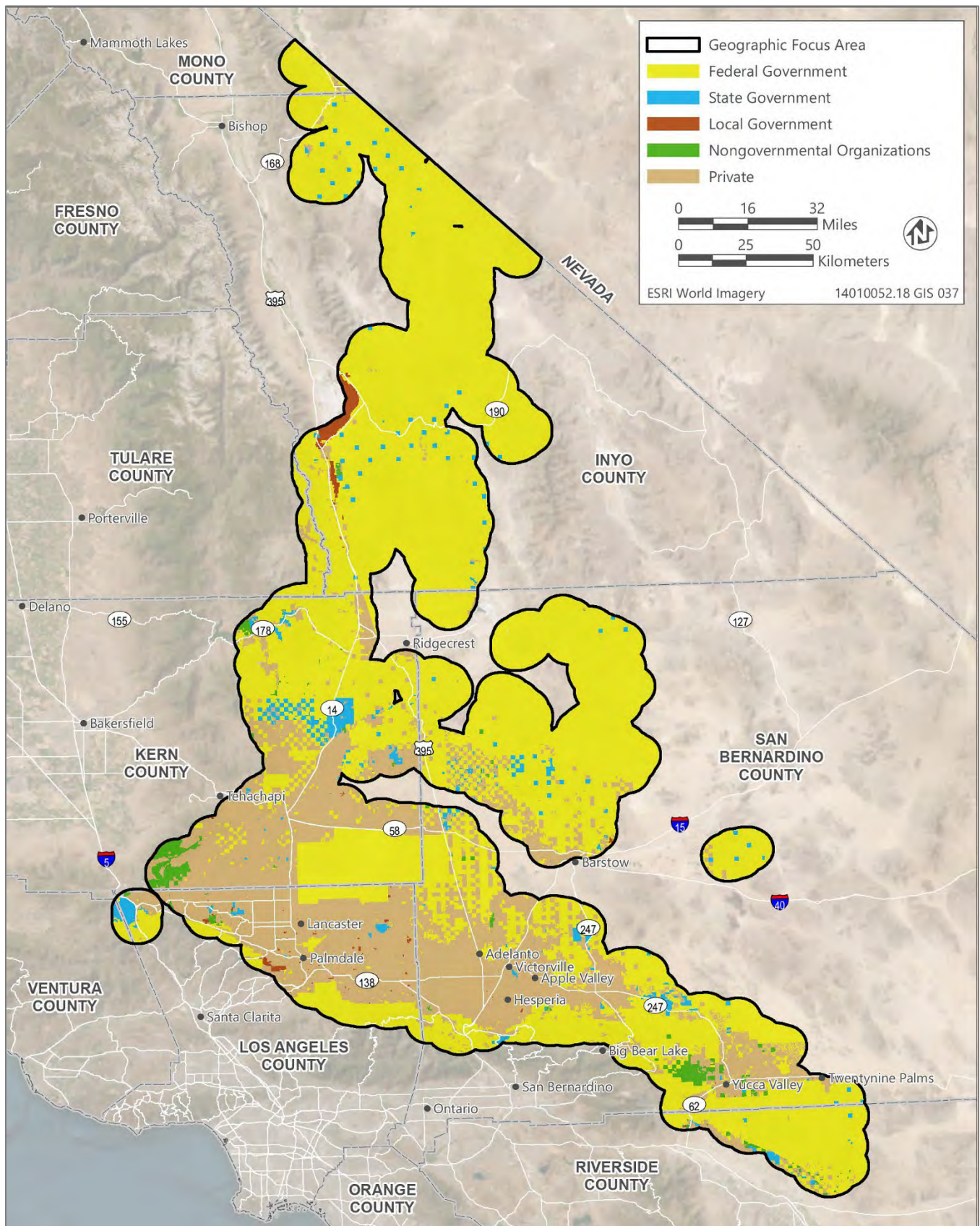
Under Fish and Game Code section 1927.6, CDFW is required to develop and implement a western Joshua tree Conservation Plan in collaboration with the Commission, governmental agencies, Tribes, and the public. Specifically, Fish and Game Code section 1927.6, subdivisions (a) and (b) state what the Conservation Plan must include (see Section 1.2.3, “Objectives”) and the schedule for preparation, review, and approval of the Conservation Plan (see Section 1.1.2, “Legal Status of Western Joshua Tree,” and Section 1.3.3, “Public”). The Fish and Game Code also defines “conservation” as the use of methods and procedures necessary to bring species listed under California Endangered Species Act (CESA) to the point at which CESA protection is no longer needed and, for species not listed under CESA, to maintain or enhance the condition of the species so that listing will not become necessary (Fish & G. Code, § 1927.1, subd. (c)).

### 2.1.2 Conservation Fund

The Western Joshua Tree Conservation Fund (Conservation Fund) is the key source of funding for implementation of management actions by CDFW. Fish and Game Code section 1927.5, subdivision (a) establishes the Western Joshua Tree Conservation Fund and requires all fees submitted to CDFW under WJTCA to be deposited into the Conservation Fund (Fish & G. Code, § 1927.5, subd. (b)). Moneys in the Fund are appropriated to CDFW solely for the purposes of acquiring, conserving, and managing western Joshua tree conservation lands and completing other activities to conserve western Joshua tree (Fish & G. Code, § 1927.5, subd. (a)). Fish and Game Code section 1927.8, subdivision (b) directs CDFW to annually adjust the amount of western Joshua tree fees. That section requires CDFW to adopt by December 31, 2026, and subsequently amend every 3 years thereafter, regulations adjusting the fees as necessary to ensure the conservation of the species.







Source: Adapted by Ascent in 2024.

**Figure 2-2 Land Ownership within the Geographic Focus Area**



### 2.1.3 Reporting and Review

Beginning in 2025, CDFW is required to submit an annual report to the Commission by January 31 of each calendar year assessing the conservation status of western Joshua tree (Fish & G. Code, § 1927.7). Fish and Game Code section 1927.7 outlines the required contents of the report.

Beginning in 2026, and at least every 2 years thereafter, the Commission is required to review the status of western Joshua tree and the effectiveness of the Conservation Plan at a public meeting. Concurrently with each review, CDFW is required to make recommendations to the Commission, as necessary, for amendments to the Conservation Plan to ensure the conservation of the species (Fish & G. Code, § 1927.8, subd. (a)).

CDFW is required to submit an updated status review report to the Commission by January 1, 2033, unless the Commission directs CDFW to complete it sooner (Fish & G. Code, §§ 1927.2, subd. (c)(2) & 1927.9). The report must incorporate any new scientific information relevant to the status of the species and must evaluate the effect of conservation and management efforts being taken pursuant to WJTCA. The Commission will consider the updated status review report in deciding whether petitioned action to list the western Joshua tree under CESA is warranted.

## 2.2 LEGAL STATUS OF WESTERN JOSHUA TREE

Western Joshua tree's legal status has a fundamental influence on the Conservation Plan. While western Joshua tree's status under state law is of primary importance to the Conservation Plan, its status under federal law is also important, because approximately 63 percent of western Joshua tree's range in California is on federal land. Western Joshua tree currently receives state protection under WJTCA and as a candidate for listing under CESA. The species is not listed under the federal Endangered Species Act (ESA) as of the publication of this Conservation Plan. The following sections describe the listing status of western Joshua tree under CESA and ESA and the influence of these laws on conservation of the species.

### 2.2.1 State Listing Status

Western Joshua tree is currently a candidate for listing under CESA (Fish & G. Code, § 2050 et seq.). As discussed in Section 1.1.2, western Joshua tree receives the same protections as species listed as endangered or threatened under CESA while it remains a candidate for listing (Cal. Code Regs., tit. 14, § 783.1, subd. (b)). Take of western Joshua tree within California is prohibited (see Fish & G. Code, § 86), except as authorized under CESA, WJTCA, or the Natural Community Conservation Planning Act (NCCPA) (Fish & G. Code, § 1927.2, subd. (a)). While western Joshua tree is a candidate species under CESA, any person or public agency may seek a take authorization for western Joshua tree under either CESA or WJTCA (Fish & G. Code, § 1927.2, subd. (b)).



Pursuant to Fish and Game Code section 1927.9, the Commission is required to reconsider listing western Joshua tree by 2033. In determining whether listing western Joshua tree under CESA is warranted, the Commission shall consider, among other enumerated factors, the Conservation Plan and the effectiveness of any conservation measures funded by the Conservation Fund (Fish & G. Code, § 1927.2, subd. (c)(2)). In making this determination, the Commission may keep the western Joshua tree as a candidate or make one of the following determinations:

1. **Listing is not warranted.** The Conservation Plan identifies management actions that are intended to conserve western Joshua tree and its habitat such that listing under CESA will not be necessary. If the Commission determines that listing western Joshua tree as endangered or threatened pursuant to CESA is not warranted, WJTCA will remain operative and the authorization of take of a western Joshua tree shall be pursuant to WJTCA (Fish & G. Code, § 1927.2, subd. (d)). The Conservation Plan would continue to guide management decisions in the long term, unless future evidence indicates that listing of the species is warranted.
2. **Listing is warranted.** If the Commission determines that listing western Joshua tree as endangered or threatened pursuant to CESA is warranted despite the management actions in the Conservation Plan, WJTCA will become inoperative and the authorization of take of western Joshua tree shall be pursuant to only CESA or NCCPA (Fish & G. Code, § 1927.2, subd. (e)).

Regardless of whether western Joshua tree is ultimately listed under CESA, take authorization for western Joshua tree can be issued under a Natural Community Conservation Plan (NCCP) as long as western Joshua tree is a covered species under the NCCP and the NCCP provides for the conservation of the species. NCCPs are discussed further below, in Section 2.3.

CDFW may also develop nonregulatory recovery plans for species listed under CESA (Fish & G. Code, § 2079.1, subd. (a)). CDFW is currently developing recovery planning guidelines, which will provide a framework for how CDFW will approach recovery planning for CESA-listed species. Recovery plans will be based on best available scientific information and will include site-specific management actions necessary for recovery of the species and objective, measurable criteria that would result in the potential delisting of the species (Fish & G. Code, § 2079.1, subd. (c)). The management actions and other recommendations in the Conservation Plan could be incorporated into a future recovery plan for western Joshua tree in the event the species is listed under CESA.





## 2.2.2 Federal Listing Status

Western Joshua tree is not currently listed under ESA. ESA (16 U.S.C. §§ 1531–1544) requires federal agencies, in consultation with US Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any ESA-listed species or result in the destruction or adverse modification of designated critical habitat of such species.



*Fallen western Joshua tree.*  
Source: National Park Service.

In September 2015, the NGO WildEarth Guardians submitted a petition to the Secretary of the Interior requesting to list Joshua tree (both western Joshua tree and eastern Joshua tree [*Yucca jaegeriana*], collectively) as a threatened species and, if applicable, designate critical habitat under ESA (Jones and Goldrick 2015). At the time of petition, western Joshua tree and eastern Joshua tree were considered two subspecies of the same species, but they are now recognized as individual

species. In response to the petition, USFWS completed a special-status assessment (Sirchia et al. 2018) and published findings in the Federal Register (84 Federal Register 41694) concluding that listing Joshua tree was not warranted. In November 2019, WildEarth Guardians filed a complaint in the US District Court, Central District of California, challenging USFW's analyses and decision not to list Joshua tree under ESA. The court ordered USFWS to reconsider its listing decision. USFWS reassessed its initial finding and prepared a revised special-status assessment (USFWS 2023). Using a review of updated information, USFWS again concluded that neither western nor eastern Joshua tree are in danger of extinction now and are not likely to become extinct in the foreseeable future in any significant portion of their ranges. USFWS concluded that the two species do not meet the definition of either an endangered or threatened species under ESA, and determined that listing either species was not warranted. In March 2024, WildEarth Guardians filed a second lawsuit requesting that the court vacate USFW's 2023 listing decision. Western Joshua tree (and eastern Joshua tree) remains unlisted and not subject to protection under ESA.

Joshua tree is identified as "FWS Focus" on the USFWS website (USFWS n.d.). USFWS does not explicitly define "FWS Focus" species, and the designation does not provide special legal protections to any species. However, the term is used to highlight species that receive a high level of interest or that are the subject of conservation efforts. USFWS staff are actively



engaged in western Joshua tree conservation efforts and host an interagency biological working group for the species (see Appendix B, “Agency and Public Input Summary Memo”).

Because western Joshua tree is not listed under ESA, there is no legal requirement for federal agencies to consider the effects of their actions on western Joshua tree under ESA. However, Joshua tree woodland is considered a special vegetation feature that should be assessed under the National Environmental Policy Act (NEPA) according to the US Bureau of Land Management (BLM) Desert Renewable Energy Conservation Plan (DRECP) Land Use Plan Amendment (LUPA) (see Section 2.3.3). The US Forest Service (USFS) would consider the effects of their actions on western Joshua tree under NEPA and the National Forest Management Act if the species was designated a USFS species of conservation concern. Securing participation by federal land management agencies to coordinate implementation of management actions for conservation of western Joshua tree on lands under federal jurisdiction would need a written memorandum of understanding (MOU) or other agreement. CDFW has contacted federal land management agencies about potential agreements during preparation of the Conservation Plan and will continue to seek their participation in actions beneficial to western Joshua tree conservation. Federal agencies with existing management plans or practices related to western Joshua tree conservation may agree to entering into a written MOU or other agreement with CDFW to implement management actions in the Conservation Plan.

The National Park Service (NPS) is expected to partner with CDFW on conservation activities because the agency is already conducting research on western Joshua tree climate refugia and implementing land management practices for the benefit of the species within Joshua Tree National Park (e.g., climate refugia plan, wildland fire management, habitat restoration, and assisted migration). CDFW and NPS have been communicating about this research.

Interagency communication and cooperation with other federal agencies, such as the BLM and the US Department of Defense (DOD) could provide an opportunity for CDFW to execute a written MOU or other agreement with these agencies to conserve western Joshua tree on federal lands, similar to existing durability agreements and MOUs between CDFW and BLM.



Source: National Park Service.



CDFW and BLM have executed two agreements: the statewide durability agreement, known as the *Memorandum of Understanding by and between the Bureau of Land Management and the California Department of Fish and Wildlife*, dated November 27, 2012 (BLM and CDFW 2012); and the DRECP durability agreement, known as the *Agreement by and between the United States Bureau of Land Management and the California Department of Fish and Wildlife*, dated October 2, 2015 (BLM and CDFW 2015). Both agreements acknowledge the importance and possibility of using BLM National Conservation Lands to contribute to the satisfaction of CDFW compensatory mitigation requirements in whole or in part. These MOUs lay out a general framework for future project-specific mitigation efforts that involves using one or more of the following tools to protect mitigation on BLM federal lands: (1) protecting mitigation lands using BLM land-use designations (e.g., wilderness areas, National Conservation Lands, areas of critical environmental concern, and wildlife allocations); (2) layering on protective measures in leases, easements, and rights-of-way; and (3) entering into co-management agreements.

The Onyx Ranch durability agreement is the first project-specific durability agreement. The agreement was enacted with a site-specific amendment to the 1983 statewide Sikes Act agreement between BLM and CDFW (*Addendum No. 5 to the Master Memorandum of Understanding between the California Department of Fish and Wildlife and the Bureau of Land Management for Sikes Act Implementation of the Portion of the Rudnick Common Allotment Relinquished Pursuant to Public Law 112-74* [BLM and CDFW 2022]), a grazing relinquishment (BLM 2020), and a co-management agreement (pending). This effort mitigated impacts from 16,453 acres of solar projects and resulted in grazing relinquishment and long-term funding of enhancement actions on 215,000 acres of the western Mojave Desert. Although impacts on western Joshua tree were not specifically being mitigated, the removal of grazing and implementation of enhancement actions for desert habitats will benefit the species. This is another example of the types of future interagency cooperative efforts that could benefit western Joshua tree on some types of federal lands.

There are also other opportunities for CDFW to execute a written MOU or other agreement with these agencies to specifically conserve western Joshua tree on federal lands. The Conservation Plan therefore focuses on the potential to collaborate with federal agencies, with an understanding that the capacity to implement specific management actions may differ among agencies based on their priority mandated responsibilities and that such efforts are more readily feasible on federal lands with conservation designations.

If listing of western Joshua tree under ESA occurs in the future, the species would receive protection under Section 9 of ESA (16 U.S.C. §1538(a)(2)), and additional conservation activity would be reasonably expected. For example, USFWS would be required to designate critical habitat, if prudent and determinable, and would be required to periodically monitor and



evaluate the status of the species. In addition, USFWS may issue protective regulations and develop and implement a recovery plan to benefit the conservation of the species (16 U.S.C. § 1533 (d), (f)). Actions on federal land would be subject to interagency consultation under Section 7 of ESA (16 U.S.C. § 1536). Listing under ESA would provide additional opportunities for cooperation between CDFW and federal agencies in developing a written MOU or other agreement and implementing coordinated conservation actions on federal land. In addition, conservation measures to protect western Joshua tree and its habitat on non-federal land may be included in habitat conservation plans (HCPs) under Section 10 of ESA (16 U.S.C. § 1539(a)).

## 2.3 CONSERVATION PLANNING PROGRAMS

### 2.3.1 Natural Community Conservation Planning Program

NCCPs are developed under NCCPA (Fish & G. Code, § 2800 et seq.). Required contents of an NCCP and standards related to conservation of biological resources are described in Fish and Game Code, section 2820, subdivision (a). NCCPs must identify and provide measures necessary to conserve and manage natural biological diversity within the plan area while allowing compatible and appropriate economic development, growth, and other human uses. NCCPs that have been approved so far cover relatively large geographic areas, allowing for more strategic conservation planning and siting of development activities within the plan area. With the approval of an NCCP, CDFW may authorize the taking of any species that is covered by the NCCP, which significantly streamlines development and other activities within the plan area (Fish & G. Code, § 2835).

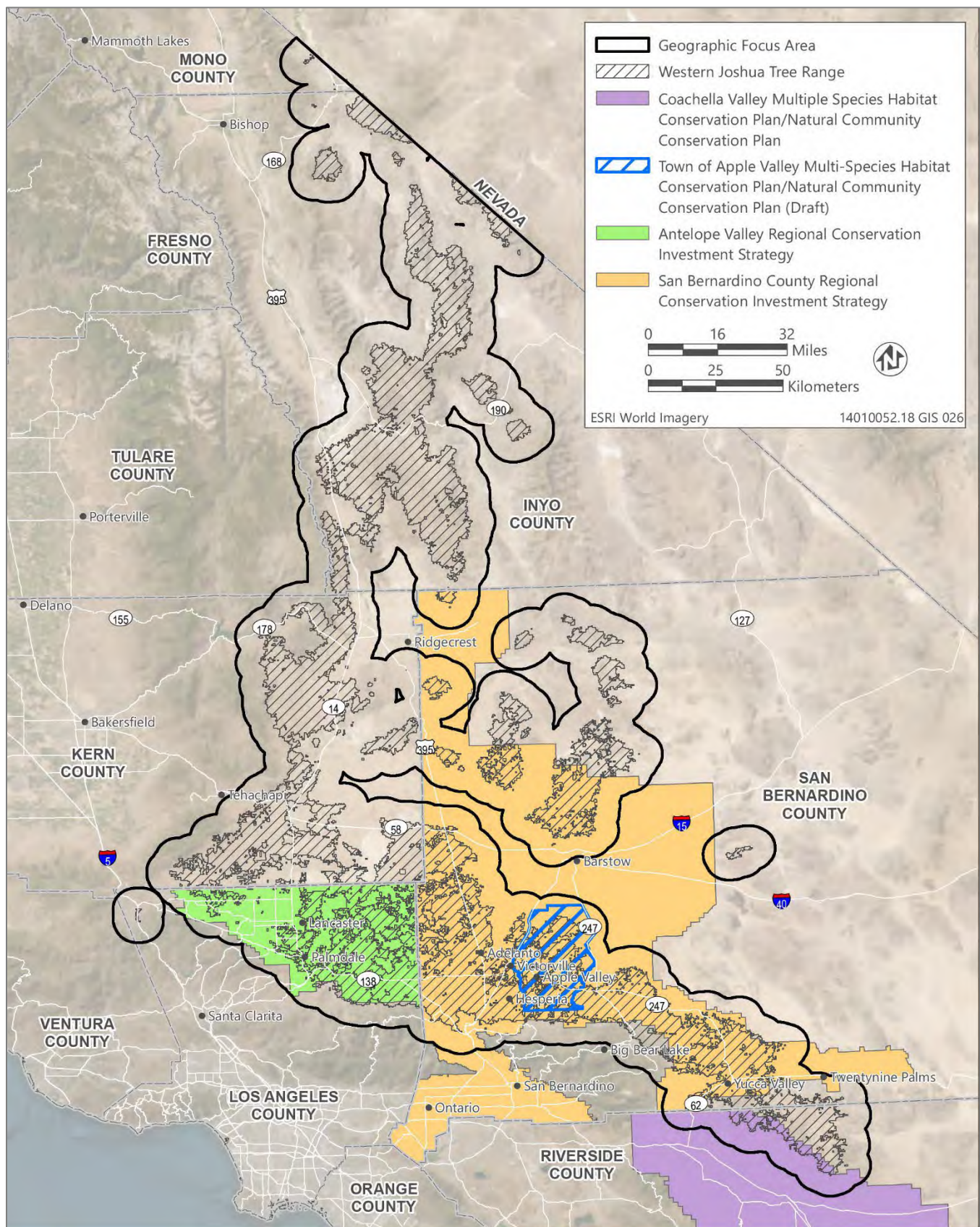
In the geographic focus area of the Conservation Plan, no NCCPs that cover western Joshua tree have yet been approved. The geographic focus area overlaps a portion of the Coachella Valley Multiple Species Habitat Conservation Plan/Natural Community Conservation Plan (MSHCP/NCCP); however, this approved plan does not provide any specific conservation or management measures for western Joshua tree. The boundaries of the Coachella Valley MSHCP/NCCP are shown in Figure 2-3. Approximately 1 percent of western Joshua tree's range in California is within the Coachella Valley MSHCP/NCCP boundary (Figure 2-3).

### 2.3.2 Regional Conservation Investment Strategies Program

The CDFW Regional Conservation Investment Strategies (RCIS) Program is a voluntary program that establishes high-quality conservation outcomes at a landscape level and enables advanced mitigation through three primary components: Regional Conservation Assessments (RCAs), Regional Conservation Investment Strategies (RCISs), and Mitigation Credit Agreements (MCAs).







Source: Data provided by CDFW in 2024; adapted by Ascent in 2024.

**Figure 2-3 Conservation Planning Programs Overlapping the Geographic Focus Area**



RCAs and RCISs are intended to be ecologically based and may encompass a wide range of habitat types; however, an RCA is broad and is not required to develop an RCIS. MCAs can only be developed under an approved RCIS.

The RCIS program allows any public agency or federally recognized Tribe that is willing to be the lead or co-lead of an RCIS to propose an RCIS document that guides protection of a range of focal plant and wildlife species and habitat types within a specified boundary for regionwide, holistic conservation. An RCIS is a comprehensive guidance document, not a binding regulatory plan. An RCIS document includes goals, objectives, actions, and priorities to guide large-scale conservation within the RCIS area. The RCIS document is developed by the agency or federally recognized Tribe in collaboration with other local entities and interested parties. Once the whole document is drafted, reviewed, and approved by CDFW, the RCIS document becomes publicly available for implementation. Existing or potential conservation and mitigation projects that fall within the RCIS boundary may elect to implement one or more conservation actions.

Within an approved RCIS boundary, an individual or entity may develop an MCA in collaboration with CDFW. An MCA is a mitigation crediting mechanism by which ecological improvements resulting from the implementation of RCIS actions can create mitigation credits for a variety of targeted species, habitats, or other sensitive resources included in an RCIS document. MCA credits can be used to mitigate project impacts, and excess credits can be sold to other entities.

The following sections describe RCIS documents that have been approved within the geographic focus area. The boundaries of these RCIS areas are shown in Figure 2-3.

## **ANTELOPE VALLEY REGIONAL CONSERVATION INVESTMENT STRATEGY**

The Antelope Valley RCIS, developed by the Desert and Mountain Conservation Authority, was approved by CDFW in January 2022 (DMCA et al. 2021). Approximately 10 percent of western Joshua tree's range in California is within the Antelope Valley RCIS. The RCIS document describes focal species for which conservation priorities, including permanent protection, enhancement, and habitat restoration, are identified. Western Joshua tree (presumed to be western Joshua tree based on location, but not specified) is identified in the Antelope Valley RCIS as a focal species of high conservation priority. In addition, Joshua tree woodland is identified as a special interest community elevated to the highest emphasis level because of local conservation concern and major threats to over 90 percent of their range, especially with respect to the potential effects of climate change. Joshua tree woodland is also considered a CDFW sensitive natural community (refer to "California Department of Fish and Wildlife" in Section 2.3.4 for additional information on sensitive natural communities).





The Antelope Valley RCIS identifies 43,738 acres of predicted habitat for western Joshua tree within the RCIS area (1 percent of western Joshua tree's range in California) and sets a conservation goal of protecting 23,901 acres of western Joshua tree stands (0.7 percent of western Joshua tree's range in California). Within the 23,901 acres identified for protection, the Antelope Valley RCIS identifies 19,052 acres for permanent protection and 4,849 acres for uplift from their current protection status. These areas represent 0.6 percent and 0.2 percent of western Joshua tree's range in California, respectively. In the context of the Antelope Valley RCIS, "uplift" means a benefit over the current protection status and can include actions such as (1) establishing a conservation easement; (2) providing secure, perpetual funding for management and monitoring of habitat, enforcement of applicable legal and permitting requirements (e.g., CESA, California Environmental Quality Act [CEQA]), and protecting habitat; or (3) implementing specific management actions to improve habitat conditions.

### **SAN BERNARDINO REGIONAL CONSERVATION INVESTMENT STRATEGY**

The San Bernardino County RCIS, developed by the San Bernardino County Transportation Authority, was approved by CDFW in April 2024 (SBCOG 2023). Approximately 31 percent of western Joshua tree's range in California is within the San Bernardino County RCIS. The San Bernardino County RCIS identifies western Joshua tree as a focal species.

### **2.3.3 Federal Land Management**

Approximately 63 percent of western Joshua tree's range in California is on federal land. There are currently no federal range-wide management efforts or recovery plans specifically for western Joshua tree. However, the species receives special protection and focused management by some federal agencies. Relevant management plans are discussed in the following sections. Many of these management plans were developed when western and eastern Joshua tree was considered a single



*Source: National Park Service.*

species. Based on the currently known western Joshua tree's range, it is presumed that these plans refer to western Joshua tree where Joshua tree is mentioned, unless otherwise noted.



Because western Joshua tree's range within California extends into federal land, which is outside the jurisdiction of the State, the conservation approach for the species will be more effective where state and federal agencies can coordinate to support and enhance conservation actions.

Written MOUs or other agreements executed by CDFW and federal agencies may promote the conservation of western Joshua tree by identifying protective measures not currently being implemented on federal land, as discussed further in Chapter 6, "Implementation." The following sections outline protective measures that are already incorporated in some federal agency management plans and are being implemented in select areas within western Joshua tree's range in California.

Lands managed by federal agencies (e.g., DOD, NPS, BLM, USFS) in the geographic focus area are shown on Figure 2-4. Wilderness areas managed by NPS, BLM, or USFS in the geographic focus area are shown on Figure 2-5. Natural resources in wilderness areas generally receive a high level of protection, including some active management for the benefit of natural resources.

## **US BUREAU OF LAND MANAGEMENT**

Approximately 3,703 square kilometers (1,429.9 square miles), or 28 percent, of western Joshua tree's range in California, is distributed within lands managed by BLM. BLM was established for the purpose of managing public lands for a variety of uses, such as energy development, livestock grazing, recreation, and timber harvesting while ensuring natural, cultural, and historic resources are maintained for present and future use. BLM lands within the geographic focus area are shown on Figure 2-6.

### ***Wilderness Areas***

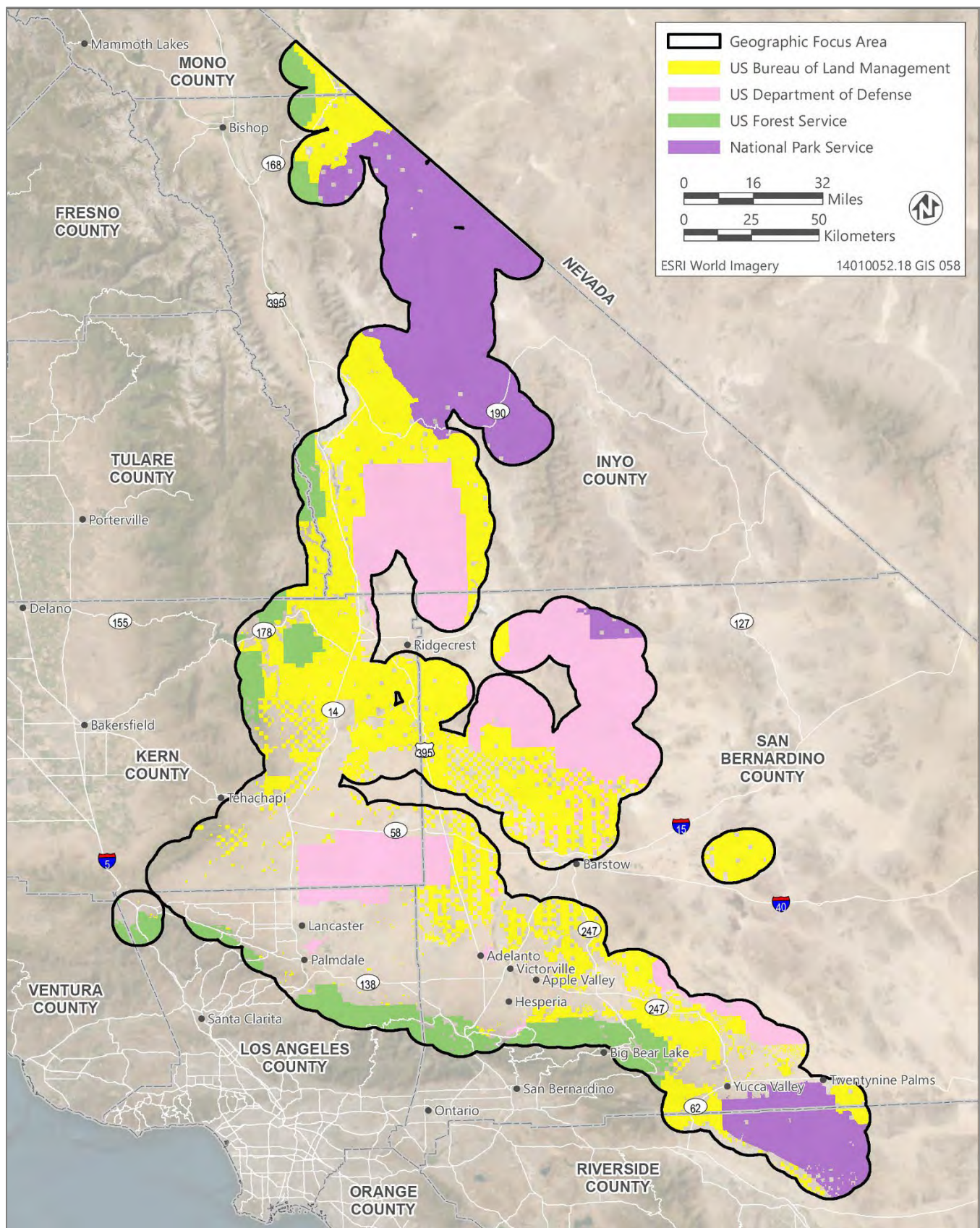
Several wilderness areas in California managed by BLM support populations of western Joshua tree and provide the species with a high level of protection. These wilderness areas are shown on Figure 2-6 and described in Table 2-2.

### ***Non-Wilderness Areas***

Outside of wilderness areas, populations of western Joshua tree on BLM lands may receive various levels of protection, but some lands supporting western Joshua tree may also be used for purposes other than conservation, such as renewable energy development. BLM has adopted various management plans within the range of western Joshua tree, as discussed in the following sections.





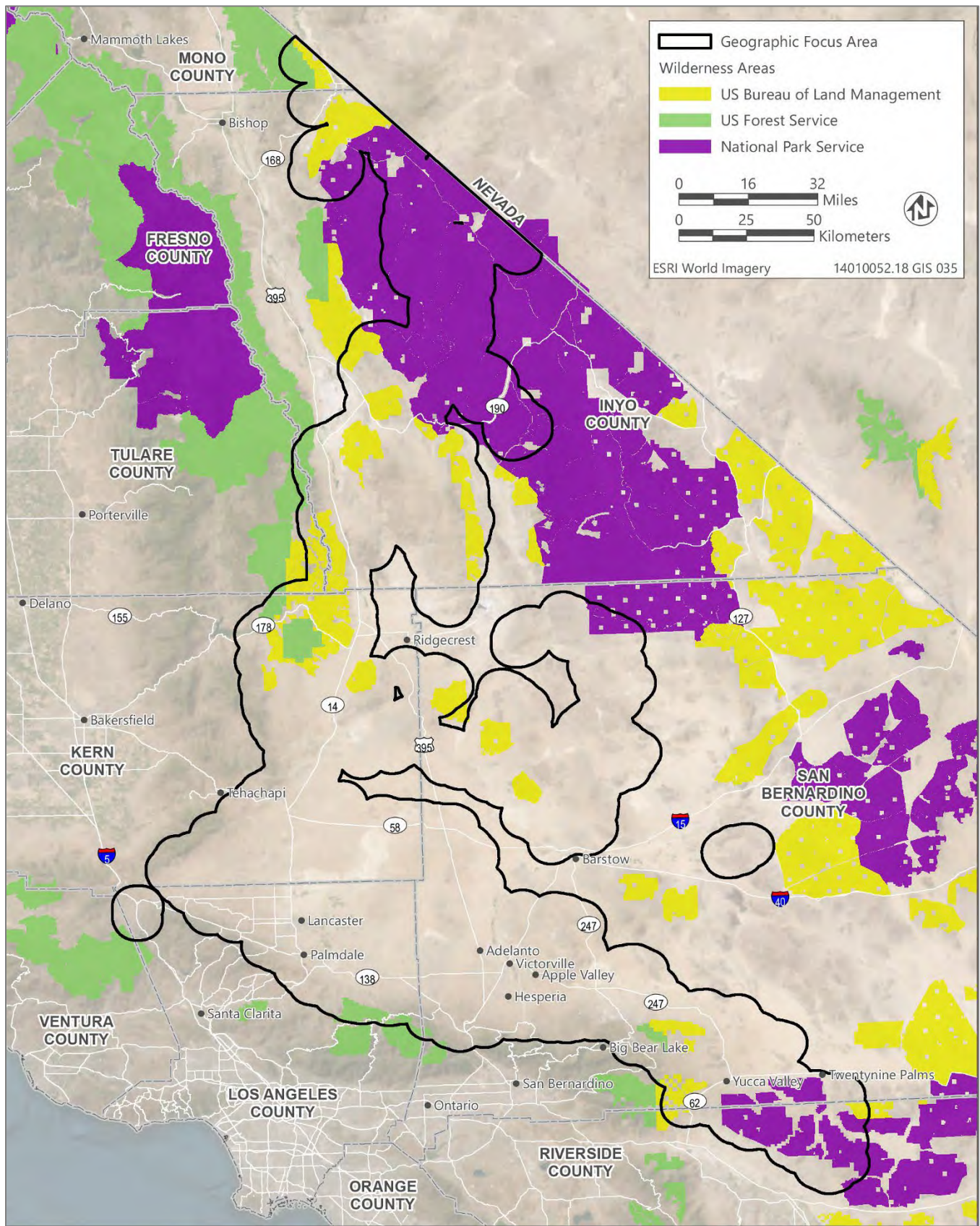


Source: Adapted by Ascent in 2024.

**Figure 2-4 Federal Lands within the Geographic Focus Area**





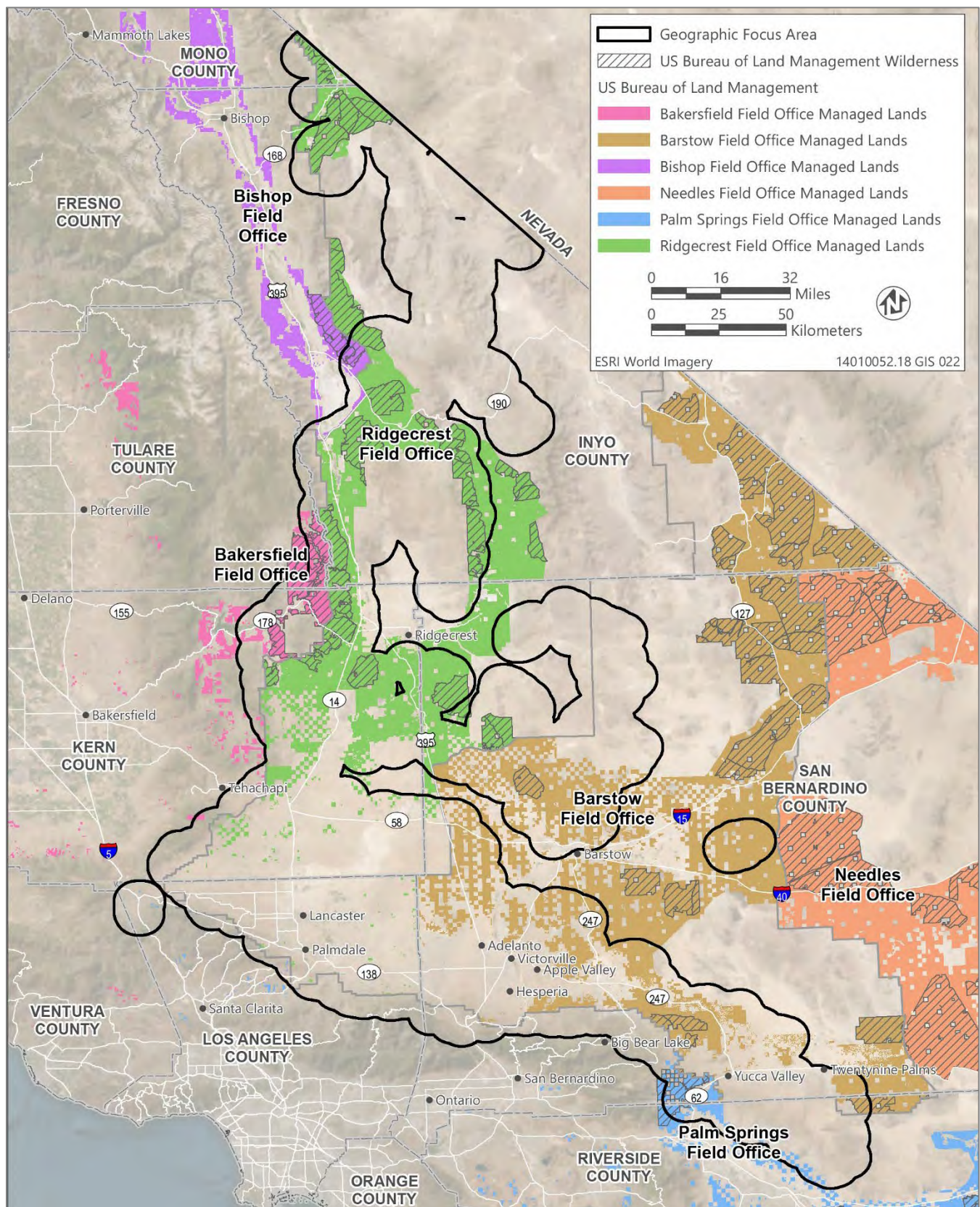


Source: Adapted by Ascent in 2024.

**Figure 2-5 Federal Wilderness Areas Overlapping the Geographic Focus Area**







Source: BLM 2024; adapted by Ascent in 2024.

**Figure 2-6 US Bureau of Land Management Lands and Wilderness Areas Overlapping the Geographic Focus Area**





**Table 2-2 US Bureau of Land Management Wilderness Areas in Western Joshua Tree Range in California**

| Wilderness Area                          | County         | BLM Field Office           | Wilderness Area in Square Kilometers (sq mi) | Range in Square Kilometers (sq mi), Percent of Range (%) | Description                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------|----------------|----------------------------|----------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Owens Peak Wilderness                    | Kern           | Bakersfield and Ridgecrest | 298.5 (115.3)                                | 187.2 (72.3), 1.4                                        | The wilderness area contains creosote bush scrub communities on the bajadas; scattered yuccas ( <i>Yucca</i> spp.), western Joshua trees, cacti, flowering annuals, cottonwoods ( <i>Populus</i> spp.), and oaks ( <i>Quercus</i> spp.) in the canyons and valleys; and juniper and pinyon woodlands with sagebrush and foothill pines ( <i>Pinus sabiniana</i> ) on the upper elevations.                                                         |
| Coso Range Wilderness                    | Inyo           | Ridgecrest                 | 199.4 (77.0)                                 | 170.9 (66.0), 1.3                                        | The wilderness area contains large stands of western Joshua trees mixed with low desert shrubs, annuals, cactuses, and creosote bushes ( <i>Larrea</i> spp.).                                                                                                                                                                                                                                                                                      |
| Kiavah Wilderness                        | Kern           | Bakersfield and Ridgecrest | 357.3 (138.0)                                | 129.9 (50.1), 1.0                                        | The wilderness area is at a transition zone between the Sierra Nevada mountains and the Mojave Desert, with vegetation that includes creosote bush, western Joshua tree, burro bush ( <i>Ambrosia salsola</i> ), and shadscale ( <i>Atriplex confertifolia</i> ) growing near pinyon pine ( <i>Pinus quadrifolia</i> or <i>Pinus monophylla</i> ), juniper ( <i>Juniperus</i> spp.), canyon oak ( <i>Quercus chrysolepis</i> ), and foothill pine. |
| Bighorn Mountain Wilderness <sup>1</sup> | San Bernardino | Barstow and Palm Springs   | 155.2 (59.9)                                 | 101.5 (39.2), 0.8 <sup>2</sup>                           | The wilderness area is a transition zone between the yucca- and western Joshua tree-covered desert floor and stands of Jeffrey pine ( <i>Pinus jeffreyi</i> ) in the higher elevations.                                                                                                                                                                                                                                                            |



| Wilderness Area               | County         | BLM Field Office           | Wilderness Area in Square Kilometers (sq mi) | Range in Square Kilometers (sq mi), Percent of Range (%) | Description                                                                                                                                                                                                                                                       |
|-------------------------------|----------------|----------------------------|----------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Malpais Mesa Wilderness       | Inyo           | Ridgecrest                 | 129.1 (49.8)                                 | 95.8 (37.0),<br>0.7                                      | The wilderness area contains creosote, low desert shrubs, and grasses in the lower elevations; western Joshua trees at middle elevations on the eastern side; and pinyon pines and junipers at higher elevations.                                                 |
| Sacatar Trail Wilderness      | Inyo           | Bakersfield and Ridgecrest | 210.0 (81.1)                                 | 91.7 (35.4),<br>0.7                                      | The wilderness area contains western Joshua trees, creosote bush, and other desert shrubs in the lower elevations and scattered pinyon and juniper woodlands dotted with cactuses in the higher elevations.                                                       |
| Sylvania Mountains Wilderness | Inyo           | Ridgecrest                 | 75.6 (29.2)                                  | 74.3 (28.7),<br>0.6                                      | This wilderness area contains sagebrush scrub in the eastern portions and pinyon pine and juniper at higher elevations. Western Joshua trees are widely distributed in the wilderness area.                                                                       |
| Grass Valley Wilderness       | San Bernardino | Ridgecrest and Barstow     | 122.2 (47.2)                                 | 69.4 (26.8),<br>0.5                                      | The wilderness area contains a few western Joshua trees, but the vegetation is dominated by a creosote bush scrub community.                                                                                                                                      |
| Piper Mountain Wilderness     | Inyo           | Bishop and Ridgecrest      | 293.7 (113.4)                                | 55.7 (21.5),<br>0.4                                      | The wilderness area contains one of the northernmost stands of western Joshua tree at the base of the Inyo Mountains. Sagebrush and pinyon-juniper woodlands are the most common vegetation communities, although conifers grow in some of the higher elevations. |
| Argus Range Wilderness        | Inyo           | Ridgecrest                 | 266.0 (102.7)                                | 49.3 (19.0),<br>0.4                                      | This wilderness area contains creosote scrub communities on the lower slopes, occasional pinyon-juniper communities at higher elevations, and western Joshua tree forests.                                                                                        |



| Wilderness Area                        | County         | BLM Field Office | Wilderness Area in Square Kilometers (sq mi) | Range in Square Kilometers (sq mi), Percent of Range (%) | Description                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------|----------------|------------------|----------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bright Star Wilderness                 | Kern           | Ridgecrest       | 38.5 (14.9)                                  | 24.4 (9.4), 0.2                                          | The wilderness area contains stands of pinyon pine and juniper in the higher elevations, and the lower elevations contain shrubs, large granite outcropping, and western Joshua trees.                                                                                                                                                                                                                     |
| El Paso Mountains Wilderness           | Kern           | Ridgecrest       | 96.2 (37.1)                                  | 16.4 (6.3), 0.1                                          | The wilderness area is dominated by creosote bushes, whereas western Joshua trees are found on the western side of Black Mountain.                                                                                                                                                                                                                                                                         |
| Inyo Mountains Wilderness <sup>1</sup> | Inyo           | Ridgecrest       | 506.2 (195.4)                                | 14.9 (5.7), 0.1                                          | The wilderness area is dominated by creosote, shadscale scrub, and sagebrush at lower elevations. Riparian habitat found in the canyons, pinyon-juniper woodlands are found on some slopes, and bristlecone pine ( <i>Pinus longaeva</i> ) and limber pine ( <i>Pinus flexilis</i> ) grow in the higher elevations. Western Joshua trees are found in the southeasternmost portion of the wilderness area. |
| Darwin Falls Wilderness                | Inyo           | Ridgecrest       | 33.1 (12.8)                                  | 11.4 (4.4), 0.1                                          | The wilderness area is dominated by a creosote bush community, with western Joshua tree woodlands higher in the hills.                                                                                                                                                                                                                                                                                     |
| Golden Valley Wilderness               | San Bernardino | Ridgecrest       | 152.9 (59.0)                                 | 6.4 (2.5), 0.1                                           | The wilderness area contains flowering annuals and is dominated by creosote bush scrub community, but also contains western Joshua trees on the mountainsides.                                                                                                                                                                                                                                             |
| Domeland Wilderness                    | Tulare, Kern   | Bakersfield      | 526.4 (203.2)                                | 2.5 (1.0), <0.1                                          | The wilderness area contains mostly pinyon pine and sagebrush. Western Joshua trees are found in the southernmost portion of the wilderness area.                                                                                                                                                                                                                                                          |



| Wilderness Area                         | County                    | BLM Field Office         | Wilderness Area in Square Kilometers (sq mi) | Range in Square Kilometers (sq mi), Percent of Range (%) | Description                                                                                                                                                                                                                                                            |
|-----------------------------------------|---------------------------|--------------------------|----------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| White Mountains Wilderness <sup>2</sup> | Mono                      | Bishop and Ridgecrest    | 934.7 (360.9)                                | 2.0 (0.8), <0.1                                          | The wilderness area contains one of the largest and highest desert mountain ranges. The wilderness area is known for its high-elevation bristlecone pine forest, but western Joshua trees have been observed in the desert portions.                                   |
| Black Mountain Wilderness               | San Bernardino            | Barstow                  | 83.2 (32.1)                                  | 1.0 (0.4), <0.1                                          | The wilderness area contains a mesa rising above an expanse of desolate, ancient lava flows. Western Joshua trees are present in the wilderness area.                                                                                                                  |
| San Geronio Wilderness <sup>3</sup>     | San Bernardino, Riverside | Barstow and Palm Springs | 390.9 (150.9)                                | 0.1(<0.1), <0.1                                          | This wilderness area is in a landscape that transitions between desert, coastal, and mountain environments, including different types of vegetation representative of each elevation. Western Joshua trees are present in the BLM-managed part of the wilderness area. |

Notes: sq mi = square miles.

<sup>1</sup> BLM and USFS manage separate parts of this wilderness area; however, western Joshua trees occur only in the area managed by BLM. Therefore, the sizes of the wilderness area and western Joshua tree range in the wilderness area represent only the area of land managed by BLM.

<sup>2</sup> BLM and USFS manage separate parts of this wilderness area. The western Joshua tree range in the wilderness area represents only the area of land managed by BLM.

<sup>3</sup> BLM and USFS manage separate parts of this wilderness area.

Sources: Esque et al. 2023; BLM 2024; compiled by Ascent in 2024.



Source: Jesse Pluim, Bureau of Land Management.



### California Desert Conservation Area Plan

The Federal Land Policy and Management Act was enacted by Congress in 1976 to direct the management of public lands of the United States. Section 601 of the Federal Land Policy and Management Act established the California Desert Conservation Area (CDCA), which encompasses 25 million acres of resource-rich desert lands in Southern California. Twelve million acres within CDCA are public lands administered by BLM. Section 601 of the Federal Land Policy and Management Act directs BLM to prepare a comprehensive long-range plan for CDCA that establishes guidelines for the management of public lands. The CDCA Plan was completed in 1980 and amended in 1999.

The CDCA Plan does not identify specific protections for western Joshua tree, but includes a Vegetation Element that contains goals related to conserving listed species, preserving unusual plant assemblages, managing wetland and riparian areas, maintaining the continued existence and biological viability of vegetation resources in CDCA while providing for consumptive needs, providing guidance for the manipulation of plant habitats or vegetation, and encouraging the use of private lands for commercial production of valuable desert plants. The CDCA Plan identifies 55 acres of Joshua tree woodland in the Superior Valley of San Bernardino County as a management area with the goal to “protect, stabilize, and enhance values” (BLM 1999). DRECP, an amendment to the CDCA Plan, is discussed in the following section. The CDCA Plan boundary, as amended, is shown in Figure 2-7.

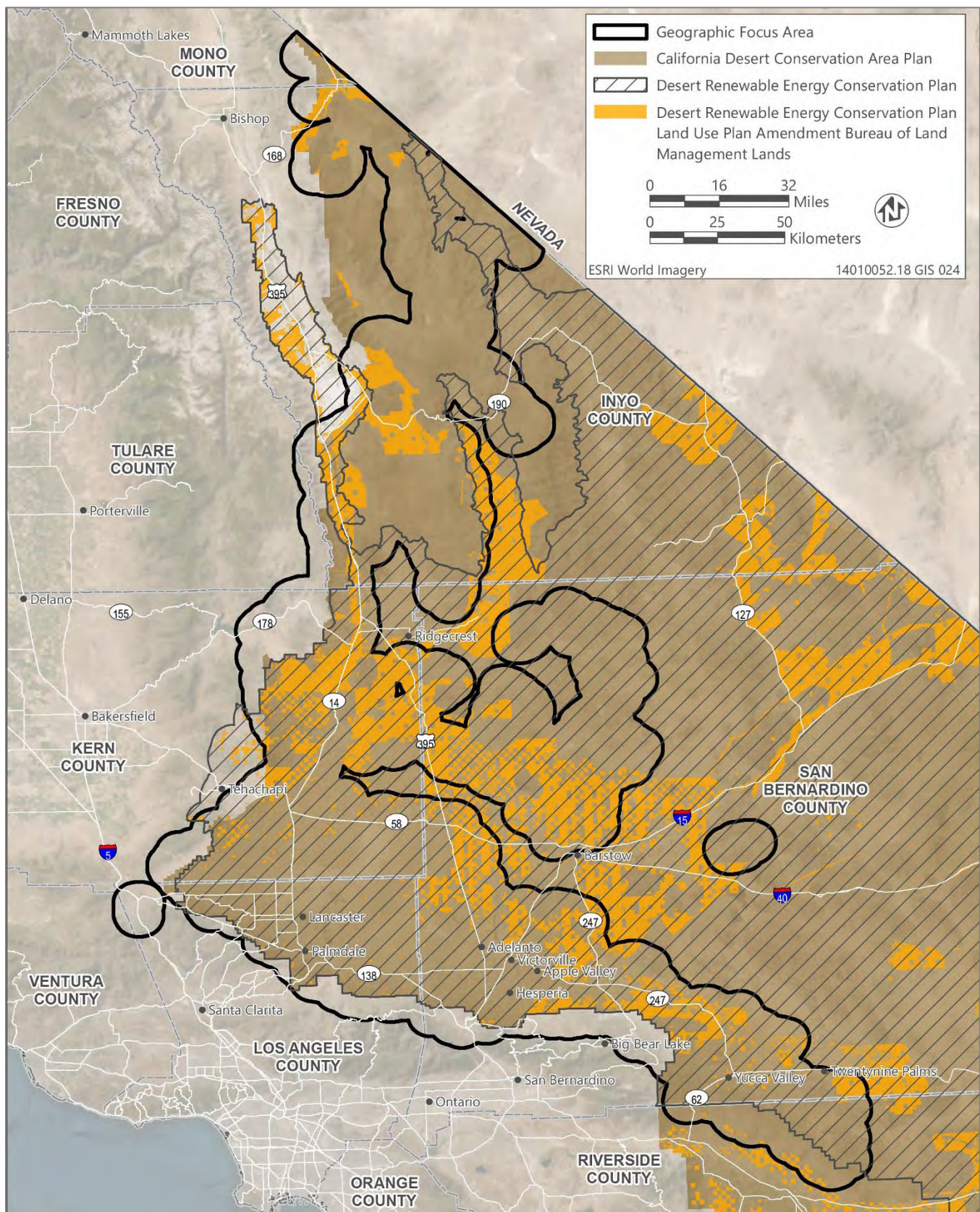
### Desert Renewable Energy Conservation Plan

DRECP is a landscape-level plan that was developed to provide effective protection and conservation of desert ecosystems while allowing for the appropriate development of solar, wind, and geothermal energy projects and promoting outdoor recreation opportunities within CDCA. DRECP covers 22.5 million acres in seven California counties—Imperial, Inyo, Kern, Los Angeles, Riverside, San Bernardino, and San Diego—including 10.8 million acres of public lands managed by BLM.

DRECP was developed by BLM, USFWS, CDFW, and the California Energy Commission, collectively known as the Renewable Energy Action Team. In addition to the Renewable Energy Action Team, the planning process involved the California State Lands Commission (CSLC), California Public Utilities Commission, California State Parks (CSP), NPS, and DOD, as well as cities, counties, Tribes, industry groups, utilities, and nongovernmental environmental organizations.







Source: Conservation Biology Institute 2024; adapted by Ascent in 2024.

**Figure 2-7 California Desert Conservation Area and Desert Renewable Energy Conservation Plan Overlapping the Geographic Focus Area**





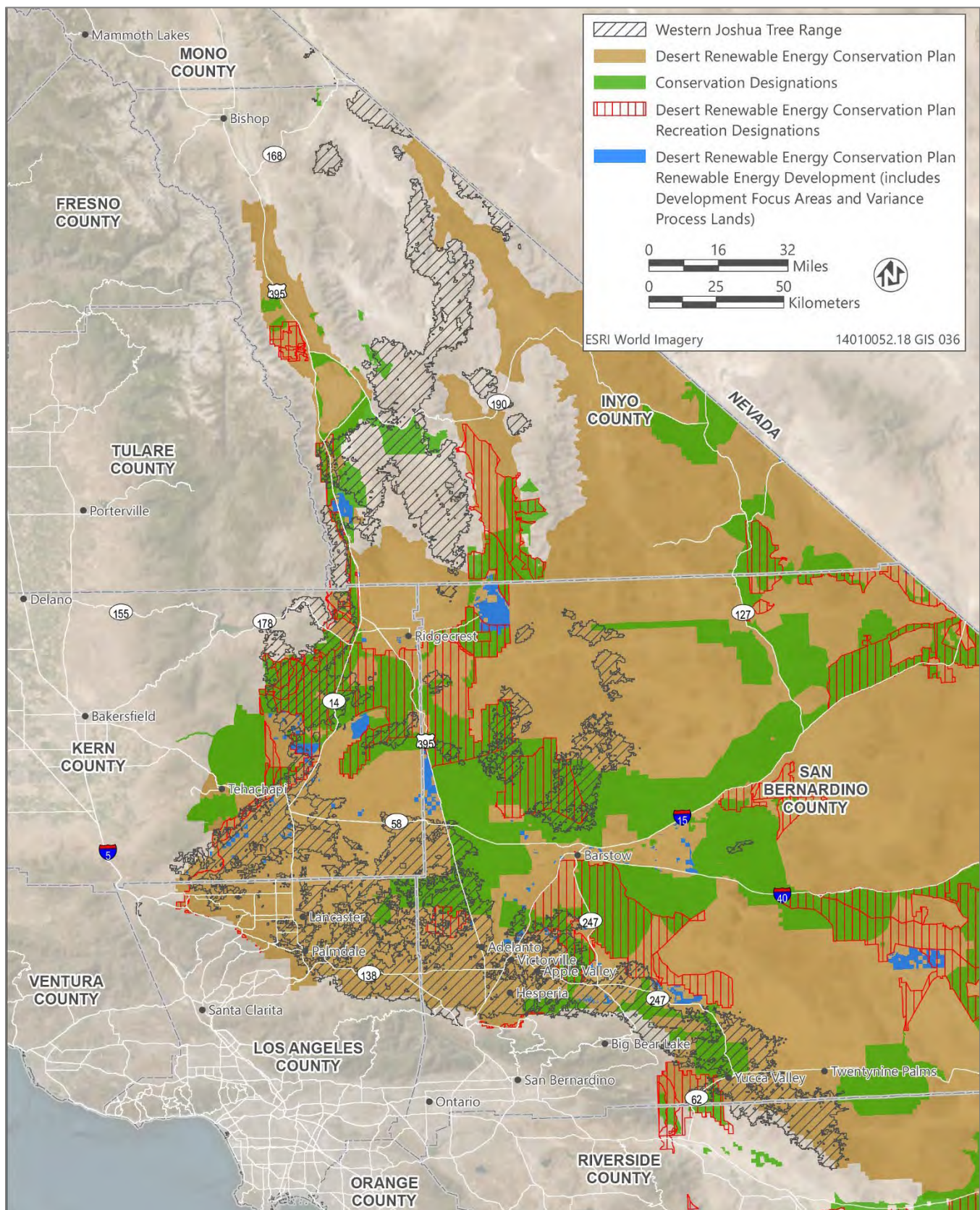
In September 2016, as part of DRECP, BLM adopted its Land Use Plan Amendment (LUPA) to the CDCA Plan, Bishop Resource Management Plan, and Bakersfield Resource Management Plan (BLM 2016). LUPA amends preexisting land designations, identifying 4.2 million new acres for conservation that are closed to renewable energy development on BLM-managed public lands and 3.5 million acres with recreation designations, which are generally closed to renewable energy development. The land designations under LUPA are shown in Figure 2-8. Under LUPA, approximately 24 percent of western Joshua tree's range in California is designated for conservation, 12 percent is designated for recreation, and 1 percent is designated for renewable energy development.

Approximately 32 square kilometers (12.2 square miles), or roughly one third of areas open for renewable energy development in DRECP, are within western Joshua tree's range and classified as ecologically core or ecologically intact (Randall et al. 2010; Parker et al. 2018). Areas for renewable energy development are referred to as Development Focus Areas and Variance Process Lands in DRECP. Development Focus Areas are areas with substantial energy generation potential, access to existing or planned transmission, and low resource conflicts. Variance Process Lands are areas where renewable energy development may be considered, but are subject to a variance process with specific permitting requirements. Ecologically core refers to lands with high landscape integrity that support conservation targets and are located in areas where protection is critical for the long-term conservation of the ecoregion's biological diversity (Randall et al. 2010). Ecologically intact lands have high landscape integrity or support conservation targets and require protection to continue to support ecological processes and provide connectivity (Randall et al. 2010).

To minimize impacts from development, LUPA includes the following objective that guides the protection of western Joshua tree on BLM-managed lands:

- **Objective 1.4:** Conserve unique landscape features, important landforms, and rare or unique vegetation types identified within the BLM Decision Area [i.e., BLM-managed surface lands and federal mineral estate lands within the DRECP planning area], including:
  - Desert riparian and wetland resources in the planning area, including riparian habitat (including microphyll woodlands), desert playas, and seeps/springs;
  - Areas of dense Joshua tree woodland;
  - Areas with unique geological activity and/or paleontological interest;
  - Rare vegetation alliances.





Source: Conservation Biology Institute 2024; adapted by Ascent in 2024.

**Figure 2-8 Land Use Designations under the US Bureau of Land Management Land Use Plan Amendment to the Desert Renewable Energy Conservation Plan**





LUPA also identifies conservation and management actions to protect biological resources. LUPA-BIO-1 requires a habitat assessment, which includes identification or delineation of Joshua trees and suitable habitat to inform siting and design considerations for all authorized activities on BLM-managed public lands. LUPA-BIO-SVF-1 requires habitat assessment of special vegetation features, which include Joshua tree woodland, for activity-specific National Environmental Policy Act analysis. LUPA-BIO-SVF-5 requires that impacts on Joshua tree woodlands be avoided to the maximum extent practicable (BLM 2016).

In 2016, BLM commissioned a report that analyzed the 6-year planning process leading to the release of the draft DRECP in 2014 (Bengtson et al. 2016). The report describes the lessons learned and recommendations for future landscape-scale planning processes based on interviews with representatives of government agencies, Native American tribes, consultants, scientists, and other interested parties.

In support of the Conservation Plan, CDFW could enter into a written MOU or other agreement with BLM to minimize renewable energy development in areas that currently support ecologically core or intact habitat for western Joshua tree or in areas that could serve as potential climate refugia for the species on BLM-managed lands. As part of these agreements, CDFW could also provide input on mitigation measures or other conditions of permit approval to reduce impacts on western Joshua tree (e.g., guidelines for relocation, seed collection).

### ***Wildland Fire Management Program***

The BLM Wildland Fire Management Program is responsible for fire management, including wildland fire suppression and prescribed fire, for the protection of natural resources on public lands. Because these public lands are intermixed with land owned and managed by other federal, state, and local government entities, BLM collaborates with other fire management agencies and is a member of the National Wildfire Coordinating Group. BLM is working to preserve ecosystems that are not currently affected by invasive plants, while restoring ecological balance in other ecosystems where invasive plants are changing the landscape and increasing wildland fire risk (BLM n.d.). BLM also participates in the interagency Burned Area Emergency Response program to address post-wildland fire recovery. The Conservation Plan presents an opportunity for CDFW to collaborate on best management practices related to western Joshua tree and its habitat for fire crews and fire resource advisors in initial wildland fire response.



*Covington Flats in Joshua Tree National Park under smoke from the Apple Fire.*

*Source: National Park Service.*



### US DEPARTMENT OF DEFENSE

Approximately 2,321 square kilometers (896.3 square miles), or 18 percent, of western Joshua tree's range in California is within lands managed by DOD. Military installations within the geographic focus area are shown on Figure 2-9.

DOD's mission does not specifically include management of lands for the benefit of natural resources, but the Sikes Act (16 U.S.C. § 670 et seq.) directs DOD to cooperate with USFWS and state fish and wildlife agencies to carry out a program for the conservation and rehabilitation of natural resources on military installations.

The Sikes Act requires DOD to develop and implement Integrated Natural Resources Management Plans (INRMPs) to guide the management of natural resources on military lands. INRMPs use an ecosystem-based approach and balance conservation and mission activities to ensure "no net loss" from testing, training, and operational activities (DOD 2023). INRMPs are valid for a period of 5 years and must be reviewed by USFWS, the relevant state agency, and the military installation.

INRMPs present an opportunity for CDFW to coordinate with military installations on management goals and actions that support the conservation of western Joshua tree on military lands. These plans could further serve as the foundation for a written MOU or other agreement between CDFW and DOD regarding the conservation of western Joshua tree. The INRMPs for the military installations within the geographic focus area that relate to the conservation of western Joshua tree are described in the following sections.

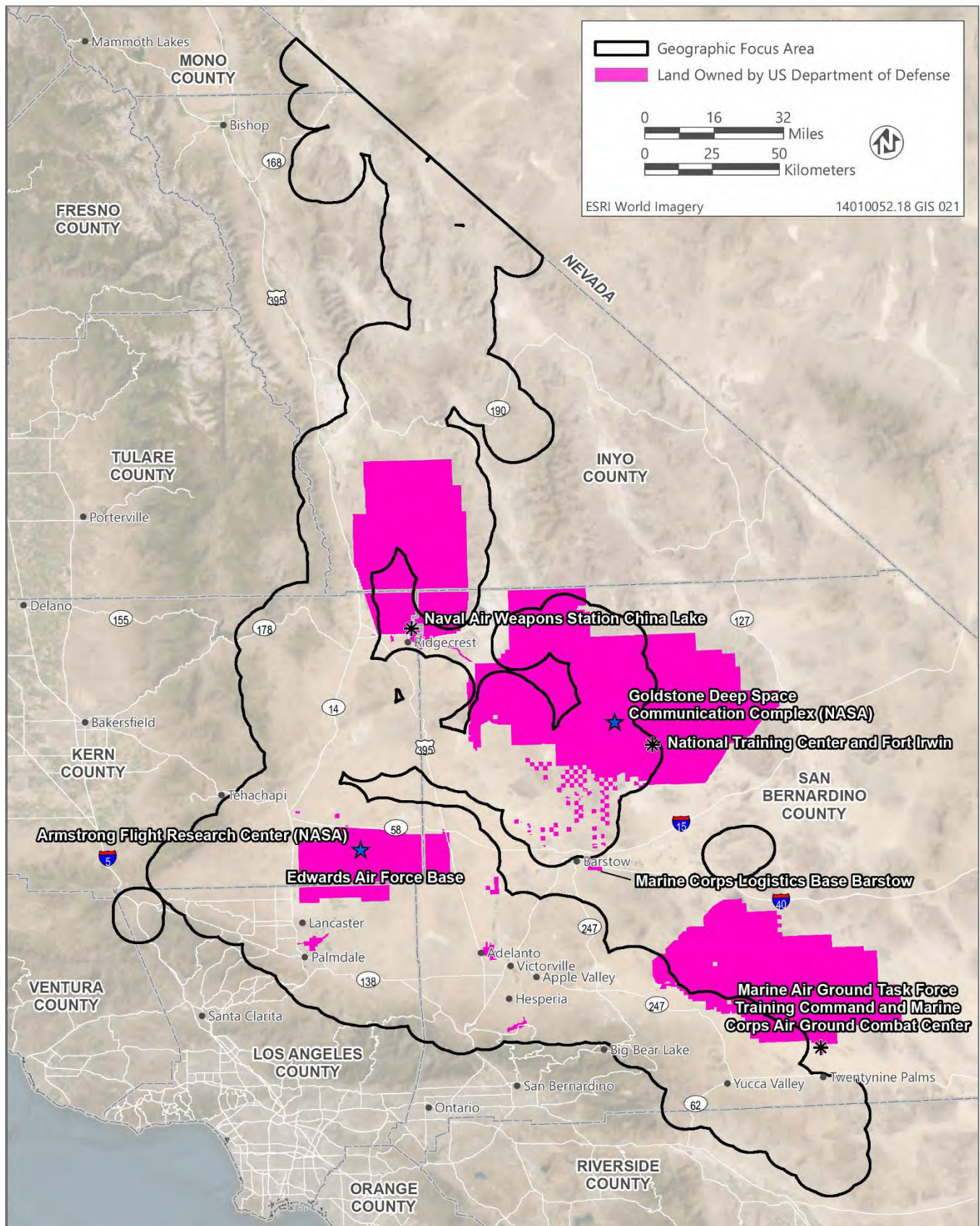
#### ***Mojave Desert Installations***

##### Edwards Air Force Base

The US Air Force adopted a 2020-2025 INRMP for the Edwards Air Force Base to support natural resources management in accordance with the Sikes Act (412 CEG/CEVA 2020). The INRMP identifies 52,719 acres of Joshua tree woodland within the Edwards Air Force Base. Overall, the US Air Force's primary management goals for desert woodlands are to "conserve these limited natural resources for [the benefit of] threatened and endangered species and other wildlife and to maintain the integrity of the desert ecosystem. For western Joshua trees specifically, the Environmental Management Directorate of the US Air Force encourages conserving the species wherever feasible. The INRMP references the Air Force Flight Test Center's 1994 *Edwards Air Force Base Revegetation Plan* (Air Force Flight Test Center 1994, cited in 412 CEG/CEVA 2020), which recommends planting Joshua trees to maintain the diversity of natural habitats on base. The US Air Force conducts western Joshua tree restoration efforts at the base in accordance with the recommendations in the *Edwards Air Force Base Revegetation Plan*.







Source: CAL FIRE 2024; adapted by Ascent in 2024.

Figure 2-9 US Department of Defense Lands Overlapping the Geographic Focus Area



The INRMP also states that the US Air Force implements avoidance and minimization measures to reduce individual fatalities of western Joshua tree and disturbance of its habitat (412 CEG/CEVA 2020). Edwards Air Force Base previously identified all western Joshua trees over 3 meters (approximately 10 feet) in height using photogrammetry, light detection, and ranging data and has reported that populations on the base are stable to increasing (412 CEG/CEVA 2017, cited in 412 CEG/CEVA 2020).

Edwards Air Force Base is collaborating with the USFWS Joshua Tree Biological Working Group to develop standardized western Joshua tree monitoring procedures. Because of the substantial acreage of Joshua tree woodland on the base and the US Air Force's management goals for the species, a written MOU or other agreement between Edwards Air Force Base and CDFW could be beneficial to western Joshua tree conservation.



*Western Joshua tree at Edwards Air Force Base.*

*Source: US Geological Survey.*

### Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center

The INRMP for the Marine Air Ground Task Force Training Command and Marine Corps Air Ground Combat Center (Combat Center) located in Twentynine Palms provides a strategy for natural resource management on the installation (MAGTFTC MCAGCC 2024). The INRMP states that yucca woodlands (identified as “Joshua Trees and/or Mojave Yucca” in the INRMP) are in the southwestern and northwestern portions of the Combat Center and cover 0.4 percent of the installation. The Combat Center has not established formal protections for western Joshua tree but incorporates measures to avoid and minimize impacts. These protections include inventorying all known western Joshua trees on the installation, maintaining a 1-kilometer (approximately 0.6-mile) no-train buffer at the base boundary that reduces potential for indirect impacts, and establishing restricted areas around portions of the population. During subsequent updates of the INRMP, CDFW has the opportunity to collaborate with the Combat Center on establishing formal protections for western Joshua tree and developing management goals and actions to support conservation of the species on the installation.

### National Training Center and Fort Irwin

The INRMP for the National Training Center and Fort Irwin provides a strategy for natural resource management at the facilities. The INRMP notes that Joshua tree is a species of





special concern and has a limited distribution and density on the National Training Center and Fort Irwin. The INRMP states that if removal of Joshua trees is necessary, trees must be relocated to sites with the same orientation and similar characteristics as their original sites to reduce the risk of tree mortality (National Training Center and Fort Irwin 2006).

#### Naval Air Weapons Station China Lake

The INRMP for the Naval Air Weapons Station China Lake provides a strategy for natural resource management at the station. The INRMP for Naval Air Weapons Station China Lake does not list western Joshua tree as a sensitive species but discusses the sensitivity of the species to fire and mentions transplantation of western Joshua tree as a component of revegetation or landscaping (US Navy n.d.).

### ***Department of Defense Wildland Fire Management Plans***

DOD uses Wildland Fire Management Plans to guide the application of prescribed fire and the response to and recovery from wildland fire incidents on military installations. Each installation manages wildland fires according to its mission, location, community, and the natural resources, ecosystems, and species that are present. Wildland fire planning is integrated with installation INRMPs so that ecological processes, impacts, and benefits are evaluated (ESOH and ASD EI&E 2022). Because wildland fires occur across jurisdictions, an interagency approach to wildland fire planning, prevention, response, and recovery is necessary. DOD is a member of the National Wildfire Coordinating Group, which includes other federal, tribal, state, and local partners.

### ***Sentinel Landscapes Partnership***

The Sentinel Landscapes Partnership is a coalition of federal agencies, state and local governments, and NGOs that work with private landowners to advance sustainable land management practices around military installations and ranges. The partnership was founded by the US Department of Agriculture, DOD, and the Department of the Interior. To fulfill the partnership's mission of conserving natural resources, the Sentinel Landscapes Partnership connects private landowners with voluntary state and federal assistance programs that provide funding for conservation easements, among other things.

The Mojave Desert Sentinel Landscape (MDSL) was designated on May 15, 2024 (Clark 2024), which will allow a coalition of state, federal, tribal, and local partners to address encroachment threats, resource concerns, and climate resilience priorities. The MDSL area is 3,539,077 acres, encompassing 2,074,754 acres of federal land (59 percent of the western Joshua tree range in California), 124,870 acres of state land (4 percent of the species' California range), and 1,337,821 acres of private land (38 percent of the species' California range). MDSL lands include the mountain foothills, sand washes, playas, and desert mountains of the Mojave Desert and Sierra Nevada (Figure 2-10).



Figure 2-10 Mojave Desert Sentinel Landscape Lands Overlapping the Geographic Focus Area

Western Joshua trees are found on all five DOD installations in the Mojave Desert, described in the previous section. In the MDSL proposal, western Joshua tree is identified as one of the more than 40 threatened, endangered, or sensitive species targeted for conservation. The proposal identifies the potential to work collaboratively with entities such as CDFW to support the following goals, which are relevant to the Conservation Plan:

- Facilitate connectivity to increase species and climate resilience.
- Provide community outreach in tandem with habitat improvements to increase the success of restoration and proactive conservation activities that support climate resiliency.
- Reduce and mitigate impacts from unauthorized off-highway vehicle (OHV) use, which compromises vegetation, soil integrity, and habitat.
- Reclaim and rehabilitate priority habitats by supporting protection, restoration, wildlife restoration, and rehabilitation of up to 50,000 acres of the MDSL.
- Develop sustainable seed propagation and climate resilient seed growing cooperatives.

The proposal also identifies the potential to leverage state funding programs to implement protection, restoration, and rehabilitation activities. CDFW has the opportunity to provide input on shared goals, establish regional priorities, and leverage funding for implementation of projects that support western Joshua tree conservation within MDSL lands.

### ***National Aeronautics and Space Administration Facilities***

The National Aeronautics and Space Administration (NASA) operates two facilities within the geographic focus area—the Armstrong Flight Research Center, which is located within Edwards Air Force Base, and the Goldstone Deep Space Communication Complex, which is associated with the US Army Fort Irwin National Training Center (Figure 2-9). Western Joshua trees are present at both facilities. NASA has not adopted specific management plans addressing conservation of the species; however, NASA strives to protect ESA-listed species and to limit adverse effects on state-specific and local species of concern in accordance with applicable federal and state laws and regulations. NASA also strives to be proactive in species management, helping to protect the ecological integrity of critical habitat and promote populations of endangered and threatened species (NASA 2024). For example, NASA installed a new antenna at the Goldstone Deep Space Communications Complex in 2020. As part of the project, NASA developed a mitigation plan that involved installing perimeter exclusion fences around some western Joshua trees and transplanting trees that could not be avoided (Wilder Ecological Consulting n.d.). If CDFW enters into a written MOU or other agreement for management of western Joshua tree within Edwards Air Force Base and the US Army Fort Irwin National Training Center, NASA could also be a party to the agreement.





## NATIONAL PARK SERVICE

Approximately 1,934 square kilometers (746.5 square miles), or 15 percent, of western Joshua tree's range in California, are distributed within lands managed by NPS. Joshua Tree National Park and Death Valley National Park, which are located within California and administered by NPS, have native populations of western Joshua tree (Figure 2-11). Mojave National Preserve, which is also administered by NPS, is outside the current range of western Joshua tree, but supports populations of eastern Joshua tree. The preserve is shown on Figure 2-11 for reference to discussions in Section 5.2, "Management Actions Necessary to Conserve Western Joshua Tree."

Natural resources on lands managed by NPS generally receive a high level of protection, including some active management, although some of these resources may be adversely affected by recreational use, development and maintenance of related infrastructure, wildland fire, and invasive species. As detailed in the following sections, NPS is implementing management practices to conserve western Joshua tree within Joshua Tree National Park, and the Agency began to implement management practices to conserve eastern Joshua tree within Mojave National Preserve following the 2020 Dome Fire.

NPS's experience with Joshua tree conservation has fundamental influence on the Conservation Plan, particularly where it can inform CDFW protocols for the successful relocation of western Joshua trees. A summary of NPS's input on the Conservation Plan to date is provided in Chapter 6.

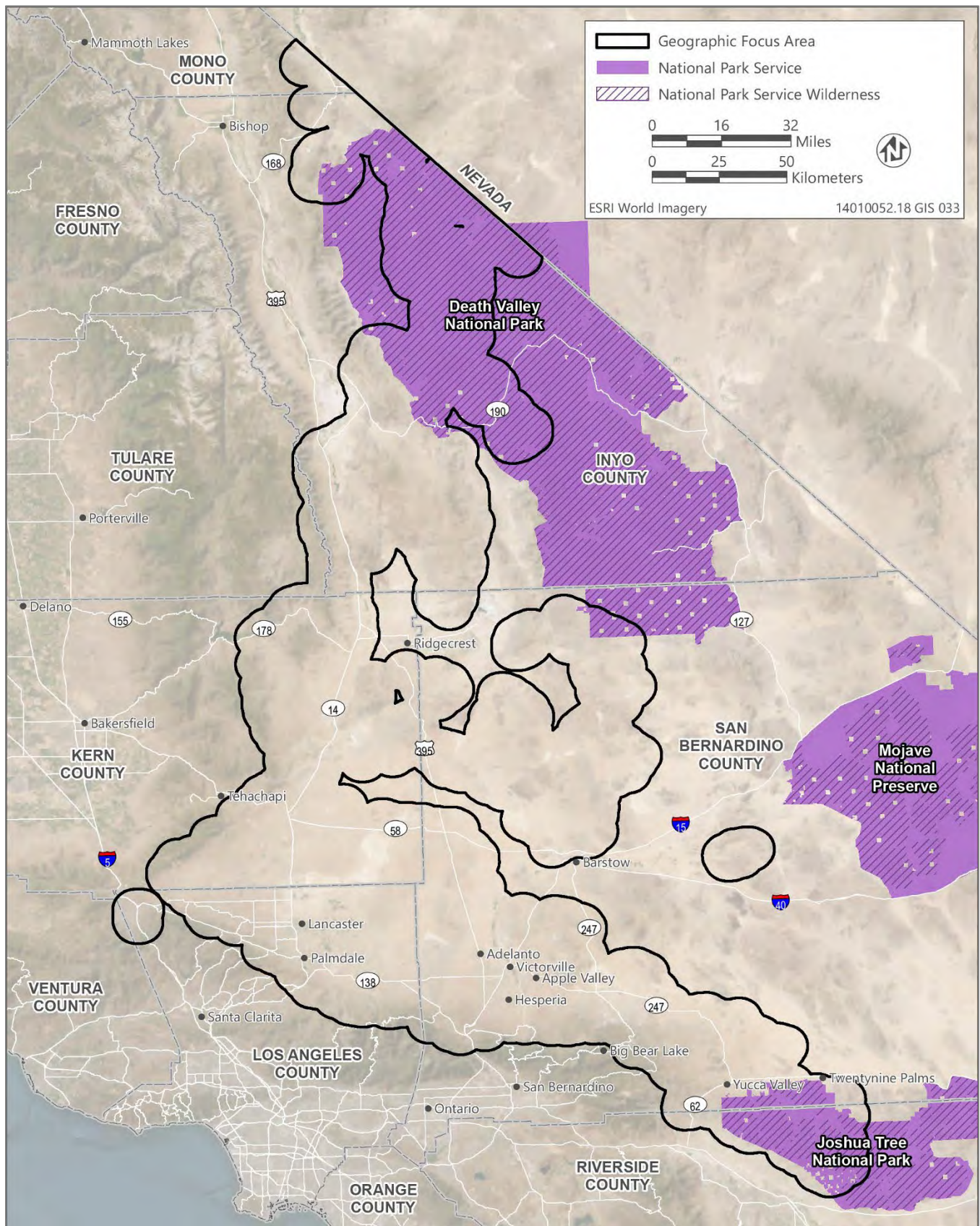
The Conservation Plan will provide an opportunity for CDFW and NPS to engage in cooperatively coordinated conservation actions. As discussed above, the Conservation Plan could support the development of a written MOU or other agreement and may also influence the development of new NPS management policies or updates to existing policies.

The following two systemwide and park-specific management plans and practices that are relevant to the conservation of western Joshua tree are discussed in the following sections.

### ***National Park Service Management Policies 2006***

NPS adopted *Management Policies 2006*, which serves as the primary guide for management of the National Park System. *Management Policies 2006* does not contain specific policies for western Joshua tree or other individual species. Rather, it sets forth general principles for the management of biological resources, including principles for the management and restoration of native plants and animals, management of threatened and endangered plants and animals, maintenance of altered plant communities, harvest of plants and animals by the public, and NPS actions that remove native plants and animals (NPS 2006).





Source: NPS 2024a; adapted by Ascent in 2024.

**Figure 2-11 National Park Service Lands Overlapping the Geographic Focus Area**





### ***National Park Service Fire Management***

To fulfill its mission, NPS manages wildland fire to protect the public, park communities, and infrastructure; conserve natural and cultural resources; and maintain and restore natural ecosystems and processes. NPS also participates in the interagency Burned Area Emergency Response program to address post-wildland fire recovery. Because NPS manages wildland fire in consideration of natural resources and ecosystem processes, NPS fire management principles and strategic guidelines are expected to have a positive influence on conservation outcomes for western Joshua tree.

Director's Order #18 contains the basic principles and strategic guidelines governing the management of wildland fire by NPS. Under Director's Order #18, each national park with burnable vegetation must have an approved fire management plan. The current fire management plan for Joshua Tree National Park provides for full suppression of all fires, including those naturally caused, until more research is collected on fire behavior and fire effects in the park and across the Mojave Desert. Park biologists are monitoring the long-term consequences of fire in desert ecosystems, as well as the effectiveness of treatments designed to hasten ecosystem recovery, to inform future fire management policies (NPS 2024b).



*Wildland fire at Joshua Tree National Park.  
Source: National Park Service.*

Death Valley National Park has a policy to suppress wildland fires and implement all fire management actions using methods, equipment, and tactics that cause the least impact to natural and cultural resources. The park also has a policy to develop fire management strategies based on science including field observations of fire effects and post-burn monitoring of selected sites (NPS 2021a).

### ***Joshua Tree National Park***

#### Superintendent's Compendium

The Superintendent's Compendium is a compilation of designations, closures, permit requirements, and other restrictions made by the superintendent. The compendium applies to all people within the boundaries of federally owned or designated public use lands within Joshua Tree National Park. It specifically prohibits possessing, destroying, injuring, defacing, removing, digging, or disturbing plants, including climbing, sitting on, or standing on live





Joshua trees or using them as anchors for hammocks or slacklines (Code of Federal Regulations, tit. 35, § 2.1, subd. (a)(1)) (NPS 2022).

### Foundation Document

Most units of the National Park System have a foundation document that provides basic guidance for planning and management decisions. Each foundation document contains significance statements, which express why a park's resources and values are important enough to merit designation as a unit of the National Park System. One of the significance statements for Joshua Tree National Park is that the park "preserves a world-renowned, undisturbed population of [western] Joshua trees..., an integral component of the Mojave Desert ecosystem." Accordingly, the Foundation Document for Joshua Tree National Park designates Joshua tree as a fundamental resource and value, warranting its primary consideration during park planning and management activities (NPS 2017a). Joshua Tree National Park is actively engaged in conservation efforts and restoration activities in support of this foundation statement (CDFW 2022).

### Joshua Tree National Park General Management Plan

Public Law 95-625, enacted on November 10, 1978, requires NPS to prepare a general management plan to provide for the preservation and public enjoyment of each area of the National Park System (54 U.S.C. § 100502). In 1995, NPS adopted a new general management plan for the administration of Joshua Tree National Monument, which subsequently became a national park in 1994. The General Management Plan provides for the management, use, and development of Joshua Tree National Park. The General Management Plan primarily applies to the developed areas of the park (NPS 1995).

The General Management Plan identifies Joshua tree as a species of special concern because the species is a major part of the park experience. The General Management Plan acknowledges that Joshua trees are likely to be affected by construction of roads, parking areas, and buildings throughout the park. The General Management Plan states NPS will make special efforts to reduce impacts on Joshua trees, including by implementing design criteria to avoid large trees, planting new trees, and salvaging and replanting trees during construction (NPS 1995).

### Backcountry and Wilderness Management Plan

On October 31, 1994, the California Desert Protection Act (Public Law 103-433) added 234,000 acres to the Joshua Tree National Monument and changed its status from national monument to national park (16 U.S.C. § 410, subd. aaa-22). This land remains largely undeveloped and primarily comprises backcountry and wilderness areas. As an amendment to the General Management Plan, Joshua Tree National Park adopted the Backcountry and Wilderness Management Plan to address the management of these lands. The purpose of the



Backcountry and Wilderness Management Plan is to minimize disturbance to resources, ensure their preservation, and offer the public a wide variety of recreational opportunities. The plan identifies the following nine actions that affect the quality of the human environment: designation of a trail system; designation of unpaved roads in lands added to the park in 1994; designation of management prescriptions for recreational climbing; designation of locations where roadside auto camping may or may not be permitted; analysis of major artificial water sources installed for wildlife; adoption of areas limited to day use only or closed to public access; establishment of group size limits for overnight stays; implementation of the Department of the Interior's Desert Tortoise Recovery Plan; and analysis of proposed additions to wilderness (NPS 2000).

Joshua tree is identified in the Backcountry and Wilderness Management Plan as a species of special interest to NPS. Although the Backcountry and Wilderness Management Plan does not identify specific protections for western Joshua tree, management actions contained in the plan were designed to minimize impacts to natural resources and avoid the removal of large plants, such as Joshua trees (NPS 2000).



*Source: Dave Hursey, National Park Service.*

### Resource Stewardship Strategy Summary

An NPS Resource Stewardship Strategy Summary is a strategic plan intended to help park managers achieve and maintain desired resource conditions over time. The Resource Stewardship Strategy Summary for Joshua Tree National Park, released in January 2021, includes a summary of key issues, stressors, and threats affecting park resources, brief descriptions of the park's priority resources and their components, stewardship goals for priority resources, and stewardship activities determined to be high priorities for the next 3 to 5 years (NPS 2021b).

The Resource Stewardship Strategy Summary discusses the threat of climate change on the mortality of Joshua trees and the elimination of suitable habitat for the species. The document identifies a long-term goal of sustaining Joshua tree populations within their potential range under climate change. Short-term goals of the document include controlling wildland fires and removing invasive plant species within Joshua tree climate change refugia, directing visitor activity to areas outside of climate change refugia to minimize trampling of young trees, and restoring degraded refugia for Joshua trees, especially in burned areas. High-priority stewardship activities are also identified in support of these goals. The document also identifies a long-term goal to better understand the trends in Joshua tree distribution, resilience to environmental change, and the effects of other stressors on Joshua trees (NPS 2021b).



## ***Death Valley National Park***

### Foundation Document

The Foundation Document for Death Valley National Park provides basic guidance for planning and management decisions within the park. The park's endemic species (i.e., a species whose geographic range or distribution is confined to a single given area) and biodiversity are identified in the Foundation Document as fundamental resources and values for which NPS intends to focus planning and management efforts. The Foundation Document does not identify specific protections for western Joshua tree but outlines several opportunities to address threats to the park's endemic species and biodiversity that may aid in the conservation of the species. These opportunities include controlling visitation to critical habitat areas, conducting additional research to guide management decisions, collaborating to ensure adequate resource protection, engaging in cooperative management with the Timbisha Shoshone Tribe to refine resource management activities, and managing fire regimes (NPS 2017b).

### Death Valley National Park General Management Plan

The General Management Plan for Death Valley National Park provides an overall management strategy for the park over a 10 to 15-year period. The General Management Plan does not specifically discuss western Joshua tree, but it includes management objectives to perpetuate plant and animal life for their essential roles in the natural ecosystem and to perpetuate rare and endangered plants and animals and species endemic to Death Valley National Park. The General Management Plan states that NPS will seek to manipulate natural landscapes and plants only when necessary to achieve approved management objectives (NPS 2021a).

### Backcountry and Wilderness Management Plan

NPS does not identify western Joshua tree as a species of special interest in the Backcountry and Wilderness Management Plan for Death Valley National Park, but it includes goals that may aid in the conservation of the species. These goals include: preserving natural resources; minimizing conflicts between users and sensitive resources; refraining from the deliberate manipulation or management of wilderness resources except as necessary; promoting the natural quality of wilderness character through the thoughtful restoration and/or maintenance of natural processes and features; preserving ecological values of wilderness; and preserving the intangible aspects of wilderness, including ongoing traditional cultural uses by the Timbisha Shoshone Tribe (NPS 2012).

## ***Mojave National Preserve***

As noted above, Mojave National Preserve is outside the current range of western Joshua tree but supports a large population of eastern Joshua tree. In September 2020, the Dome Fire burned over 43,000 acres in Mojave National Preserve, including over an estimated one million



eastern Joshua trees (Smith et al. 2023). The perimeter of the Dome Fire overlaps a modelled eastern Joshua tree climate refugium where favorable conditions are expected to persist during future warming (Smith et al. 2023).

In response to past grazing impacts and the loss of eastern Joshua trees in the Dome Fire and the species' poor seed dispersal characteristics, Mojave National Preserve staff prepared the Dome Fire Restoration Plan in May 2021 (Kaiser 2021). The plan outlines restoration, monitoring, management, and maintenance strategies to restore eastern Joshua tree within the predicted climate refugium. These activities include planting and watering trees and applying herbicide to control invasive annual grasses. As part of the Dome Fire Restoration Plan, Mojave National Preserve staff are collecting data on survival rates associated with various treatments, including the use of cages to exclude herbivores and planting under shrubs to simulate nurse plants. Although the monitoring data from this restoration project apply to eastern Joshua tree, the resulting data can provide important information related to postfire recovery and survivability and successful restoration strategies for western Joshua tree.



*Eastern Joshua trees burned in the Dome Fire in Mojave National Preserve.*

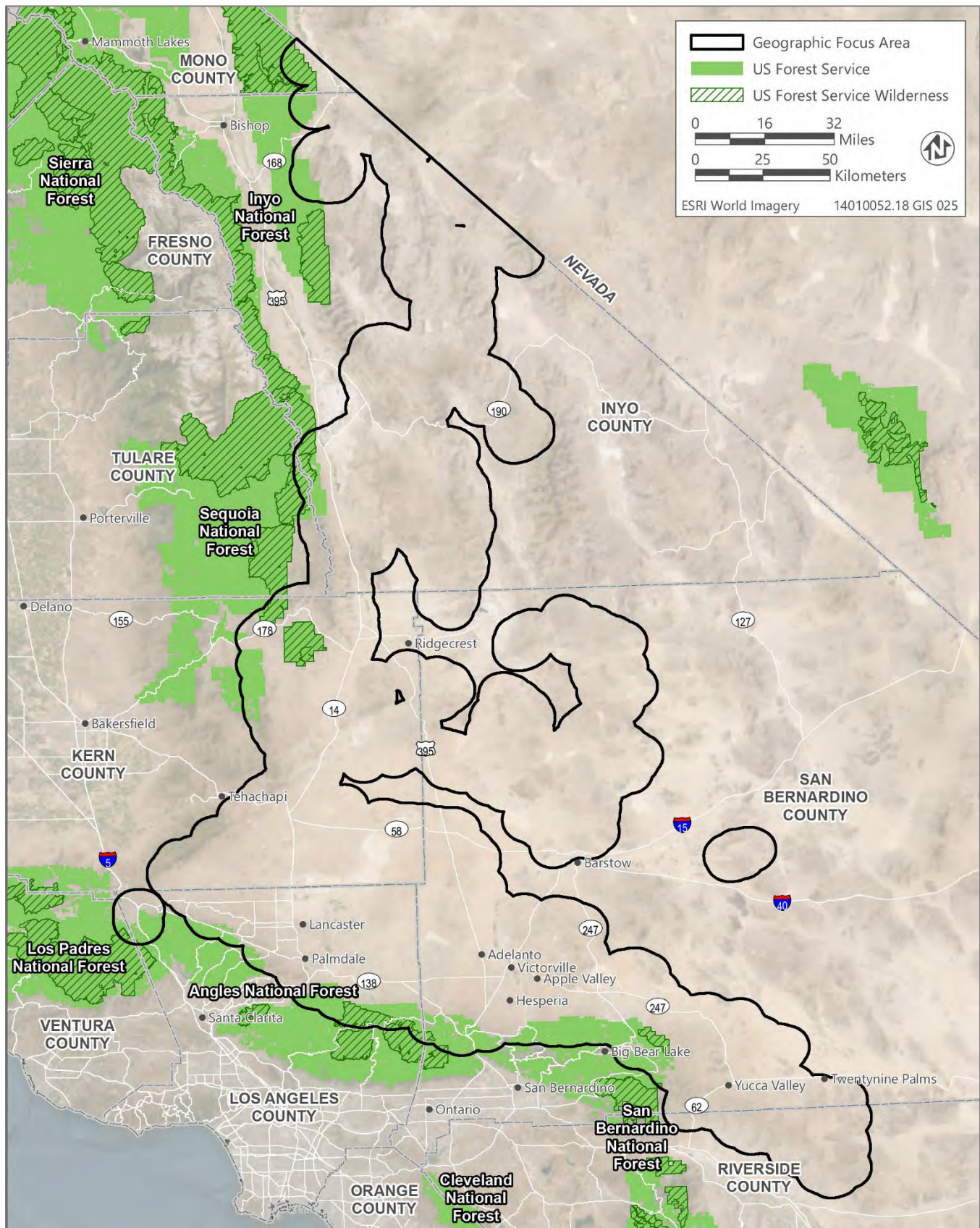
Source: Drew Kaiser, California Department of Fish and Wildlife.

### US FOREST SERVICE

Approximately 245 square kilometers (94.6 square miles), or 2 percent, of western Joshua tree's range in California, is distributed within lands managed by USFS. USFS manages several national forests and wilderness areas within the geographic focus area, which are shown on Figure 2-12. The national forests and wilderness areas in western Joshua tree's range in California are described in Table 2-3.







Source: USFS 2024; adapted by Ascent in 2024.

Figure 2-12 US Forest Service Lands Overlapping the Geographic Focus Area



**Table 2-3 US Forest Service Lands in Western Joshua Tree Range in California**

| National Forest or Wilderness Area            | County                               | National Forest or Wilderness Area in Square Kilometers (sq mi) | Range in Square Kilometers (sq mi), Percent of Range (%) | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------|--------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| San Bernardino National Forest                | San Bernardino                       | 3,284.3 (1,268.1)                                               | 127.1 (1.0), 49.1                                        | The National Forest contains mixed conifer forests and oak woodlands, pinyon juniper stands, and chaparral and semidesert areas, which include western Joshua trees.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Bighorn Mountain Wilderness Area <sup>1</sup> | San Bernardino                       | 155.2 (59.9)                                                    | 44.2 (17.1), 0.3 <sup>2</sup>                            | The wilderness area is a transition zone between the western Joshua tree and other yucca-covered desert floor and stands of Jeffrey pine in the higher elevations.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Kiavah Wilderness Area                        | Kern                                 | 357.3 (138.0)                                                   | 28.8 (11.1), 0.2                                         | The wilderness area is at a transition zone between the Sierra Nevada mountain range and the Mojave Desert, with vegetation that includes creosote bush, western Joshua tree, burro bush, and shadscale growing near pinyon pine, juniper, canyon oak, and foothill pine.                                                                                                                                                                                                                                                                                                                       |
| Sequoia National Forest                       | Tulare, Kern, Fresno                 | 4,451.5 (1,718.7)                                               | 1.9 (0.7), <0.1                                          | The National Forest contains mixed forests of ponderosa pine ( <i>Pinus ponderosa</i> ), incense cedar ( <i>Calocedrus decurrens</i> ), white fir ( <i>Abies concolor</i> ), sugar pine ( <i>Pinus lambertiana</i> ), and scattered groves of giant sequoia ( <i>Sequoiadendron giganteum</i> ) in the low- to mid-montane elevations. Jeffrey pines are scattered on dry granitic slopes, and pure stands of red fir forest and lodgepole pine forest are found in the upper montane zone. Western Joshua trees are found in the southernmost and easternmost portions of the National Forest. |
| Angeles National Forest                       | Los Angeles, San Bernardino, Ventura | 2,630.5 (1,015.6)                                               | 1.3 (0.5), <0.1                                          | The National Forest is predominately covered with dense chaparral, which changes to slopes covered in pine ( <i>Pinus</i> spp.) and fir ( <i>Abies</i> spp.) in the higher elevations. Western Joshua trees are present at lower elevations.                                                                                                                                                                                                                                                                                                                                                    |
| Inyo National Forest                          | Inyo, Mono, Tulare, Fresno, Madera   | 8,093.7 (3,125.0)                                               | 1.3 (0.5), <0.1                                          | The National Forest contains arid shrublands, conifer forests, and mountain meadows. Western Joshua trees are present in the desert scrub on the lower slopes of the eastern Sierra Nevada Mountains in the southern part of the National Forest.                                                                                                                                                                                                                                                                                                                                               |
| White Mountains Wilderness <sup>1</sup>       | Mono                                 | 934.7 (360.9)                                                   | 0.8 (0.3), <0.1 <sup>2</sup>                             | The wilderness area contains one of the largest and highest desert mountain ranges. The wilderness area is known for its high-elevation bristlecone pine forest, but western Joshua trees have been observed in the desert portions.                                                                                                                                                                                                                                                                                                                                                            |





| National Forest or Wilderness Area   | County                    | National Forest or Wilderness Area in Square Kilometers (sq mi) | Range in Square Kilometers (sq mi), Percent of Range (%) | Description                                                                                                                                                                                                                                                             |
|--------------------------------------|---------------------------|-----------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| San Gorgonio Wilderness <sup>1</sup> | San Bernardino, Riverside | 390.9 (150.9)                                                   | 0.1 (<0.1), <0.1                                         | This wilderness area is in a landscape that transitions between desert, coastal, and mountain environments, including different types of vegetation representative of each elevation. Western Joshua trees are present in the USFS-managed part of the wilderness area. |

Notes: sq mi = square miles.

<sup>1</sup> This wilderness area is managed jointly by BLM and USFS.

<sup>2</sup> The western Joshua tree range in the wilderness area represents only the area of land managed by USFS.

Sources: Esque et al. 2023; USFS 2024; compiled by Ascent in 2024.

## ***US Forest Service Land Management Plans***

The land management plans for the Angeles and San Bernardino National Forests, which specifically reference western Joshua tree, are described in the following sections.

### Angeles National Forest Land Management Plan

The Angeles National Forest Land Management Plan describes USFS's strategic direction for managing the land and resources within the Angeles National Forest over the next 10 to 15 years. As identified in the Angeles National Forest Land Management Plan, the Mojave Front Country within the Angeles National Forest contains western Joshua trees at lower elevations. The Angeles National Forest Land Management Plan states that one of the desired conditions for this area is to maintain a natural-appearing landscape, which includes preserving distinct desert views of Joshua trees. The Land Management Plan does not include specific protections for western Joshua tree but includes vegetation management standards and other design criteria required under the Code of Federal Regulations title 36, part 219 that may aid in the protection of the species (USFS 2005a).

### San Bernardino National Forest Land Management Plan

The San Bernardino National Forest Land Management Plan describes USFS's strategic direction for managing the land and resources within the San Bernardino National Forest over the next 10 to 15 years. Within the San Bernardino National Forest, western Joshua trees are found in the high desert landscape in the eastern portion of the Big Bear backcountry, at lower elevations within the Desert Rim and the Mojave Front Country, and in the Bighorn Mountain Wilderness.



The San Bernardino National Forest Land Management Plan states that one of the desired conditions for these areas is to preserve valued landscape attributes, such as Joshua tree stands. Within the Mojave Front Country, another desired condition is to manage Joshua tree woodlands to provide fire protection for adjacent urban communities, compatible dispersed recreation use, high quality wildlife habitat, and protection for plant communities from type conversion by frequent burning. The San Bernardino National Forest Land Management Plan does not include specific protections for western Joshua tree but includes vegetation management standards and other design criteria required under Code of Federal Regulations title 36, part 219 that may aid in the protection of the species (USFS 2005b).

### ***US Forest Service Fire Management***

USFS manages wildland fire on National Forest System lands and also partners with Tribes and federal, state, and local governments as part of the National Wildfire Coordinating Group. USFS suppresses fires that threaten people and communities but also uses prescribed fire to benefit natural resources and prevent the buildup of flammable vegetation. USFS also participates in the interagency Burned Area Emergency Response program and implements rehabilitation and restoration activities to repair natural resources damaged by wildland fires. These activities include planting trees, reestablishing native species, restoring habitats, and removing invasive plants.



Source: Bob Wick, Bureau of Land Management.



## NATURAL RESOURCES CONSERVATION SERVICE

Approximately 0.3 square kilometer (74.1 acres), or less than 0.1 percent, of western Joshua tree's range in California, is distributed within lands managed by the Natural Resources Conservation Service (NRCS). This land is part of a conservation easement established under the Wetland Reserve Easements program, which was established to help private and tribal landowners protect, restore, and enhance wetlands that have been previously degraded due to agricultural uses. NRCS has the right to develop and implement a Wetland Reserve Plan of Operations for land enrolled in wetland reserve easements. These plans detail practices to help restore, protect, and enhance wetland functions and values.

### 2.3.4 State of California Land Management

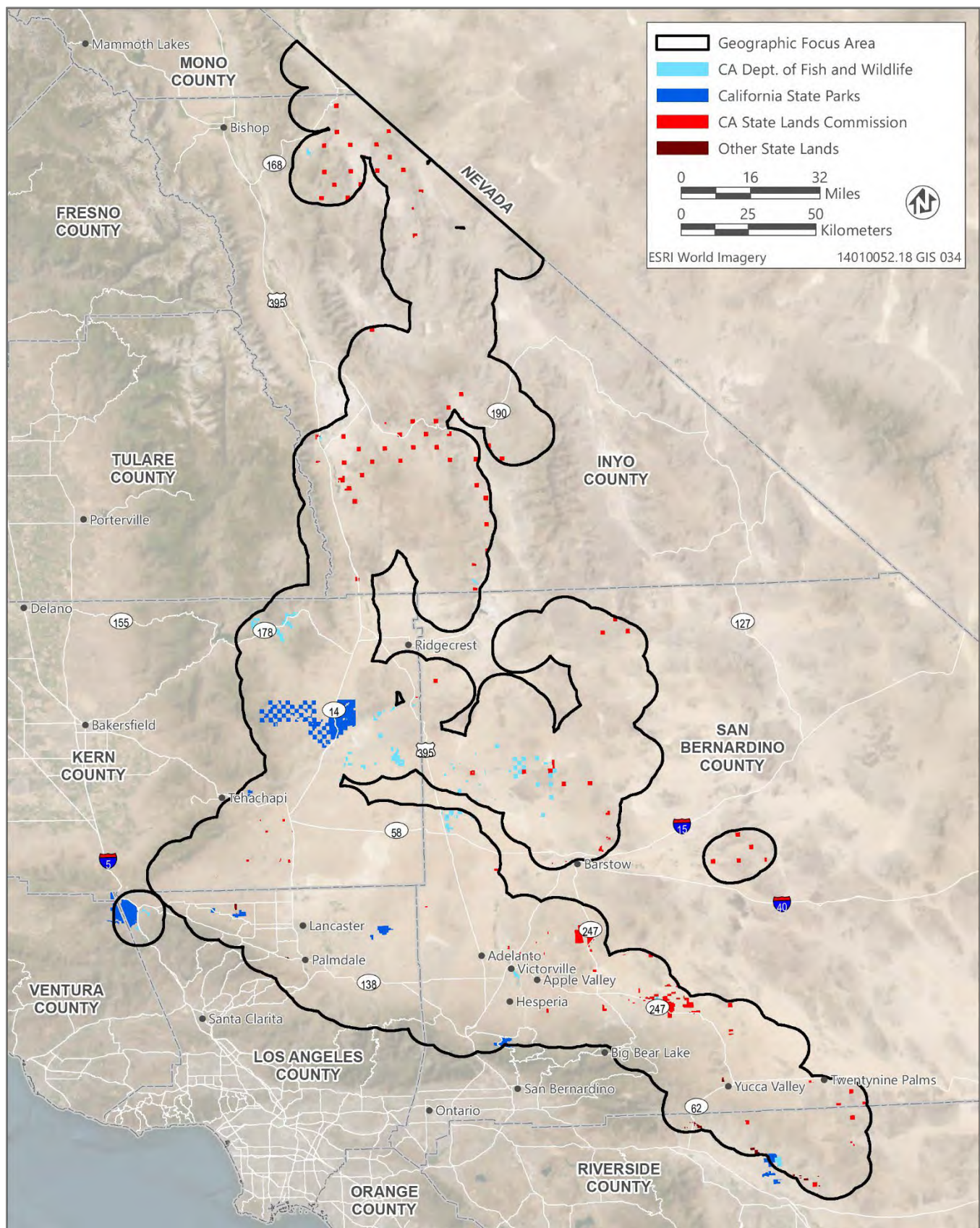
State agencies manage approximately 2 percent of land within western Joshua tree's range in California. State Lands within the geographic focus area, including lands managed by CDFW, CSP, and CSLC, are shown on Figure 2-13. Lands identified as "Other State Lands" on Figure 2-13 consist of lands owned by the California Department of Water Resources, University of California, California Wildlife Conservation Board, Coachella Valley Conservation Commission, Coachella Valley Mountains Conservancy, and Desert and Mountain Conservation Authority. Natural resources on state-managed lands generally receive a high level of protection, including some active management and research for the benefit of natural resources (CDFW 2022).

## CALIFORNIA STATE PARKS

CSP manages the California State Park System. The State Park System is divided into 21 districts. The Central Valley, Great Basin, Inland Empire, and Sierra Districts overlap with the geographic focus area. Lands owned by CSP within the geographic focus area are shown on Figure 2-13, and the distribution of western Joshua tree's range in California within State Parks is listed in Table 2-4. Approximately 149 square kilometers (57.4 square miles), which is about 1 percent of western Joshua tree's range in California, overlaps with the California State Park System.







Source: CAL FIRE 2024; adapted by Ascent in 2024.

Figure 2-13 State Lands Overlapping the Geographic Focus Area



**Table 2-4 California State Parks in Western Joshua Tree Range in California**

| Park                                              | District    | County      | Park Area in Square Kilometers (sq mi) | Range in Square Kilometers (sq mi), Percent of Range (%) | Description                                                                                                                                                                                                                                                                             |
|---------------------------------------------------|-------------|-------------|----------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Onyx Ranch State Vehicular Recreation Area        | Great Basin | Kern        | 105.2 (40.6)                           | 82.1 (31.7), 0.6                                         | The setting consists of rugged Mojave Desert terrain. Recreational opportunities include trails for OHV use and campgrounds. This recreation area has the largest contiguous stands of western Joshua trees in the California State Parks System.                                       |
| Red Rock Canyon State Park                        | Great Basin | Kern        | 109.3 (42.2)                           | 50.7 (19.6), 0.4                                         | The setting consists of a desert landscape with cliffs, buttes, and rock formations. Recreation opportunities include developed campsites, day use areas, hiking and equestrian trails, and primitive roads for OHV recreation. Western Joshua trees are currently present at the park. |
| Saddleback Butte State Park                       | Great Basin | Los Angeles | 12.0 (4.6)                             | 11.7 (4.5), 0.1                                          | The setting consists of a granite mountaintop surrounded by high desert landscape, including native Joshua tree woodlands. Recreation opportunities include day-use picnic areas, campground facilities, and equestrian trails. Western Joshua trees are currently present at the park. |
| Arthur B. Ripley Desert Woodland State Park       | Great Basin | Los Angeles | 2.3 (0.9)                              | 2.3 (0.9), <0.1                                          | The setting consists of a Joshua tree and juniper woodland stand. Recreation opportunities include picnic areas and hiking trails. Western Joshua trees are currently present at the park.                                                                                              |
| Antelope Valley Indian Museum State Historic Park | Great Basin | Los Angeles | 0.6 (0.2)                              | 1.6 (0.6), <0.1                                          | The setting consists of desert parkland on the south side of Piute Butte in the Mojave Desert and sits against a backdrop of western Joshua trees and towering rock formations. Western Joshua trees are currently present at the park.                                                 |
| Hungry Valley State Vehicular Recreation Area     | Great Basin | Los Angeles | 76.9 (29.7)                            | 0.3 (0.1), <0.1                                          | The setting consists of hills and valleys, grassland, coastal sage scrub, and oak woodland. Recreational opportunities include trails for OHV use and campgrounds. Western Joshua trees are currently present at the recreation area.                                                   |

Notes: OHV = off-highway vehicle; sq mi = square miles.

Sources: Esque et al. 2023; CSP 2024a; compiled by Ascent in 2024.

### **California State Parks Department Operations Manual**

The “Natural Resources” chapter of the CSP Department Operations Manual (CSP 2004) contains many policies that can apply to management of western Joshua trees. The following are examples of two high-level, general policies; however, more detailed guidance can be found in the “Plant Management” section, DOM 0310-0310.9.





- **DOM 0310.1.1: Plant Management Policy.** It is the policy of the Department to acquire, preserve, and interpret outstanding examples of native California species; and to acquire, perpetuate, and interpret natural plant communities, associations, natural processes (e.g., succession), and examples of rare, endangered, endemic, or otherwise sensitive native California plants. This will be done in concert with other agencies and organizations.
- **DOM 0313.2.1: Wildfire Management.** The Department's goal is to prevent all unplanned human-caused fires on its lands. Given that some unplanned fires will occur, both lightning-caused and human-caused, it becomes the Department's responsibility to protect human life, and to minimize damage to park facilities and resources from wildfires and from all suppression activities.

### ***State Park Units Classified as State Parks***

The following sections discuss units classified as State Parks that have management goals and policies relevant to western Joshua tree.

#### Arthur B. Ripley Desert Woodland State Park

In 1995, CSP established the 566-acre Arthur B. Ripley Desert Woodland State Park (Ripley State Park) in Los Angeles County. Although CSP has not adopted a general plan for this park, the agency has undertaken management efforts to protect Joshua tree and juniper woodland, which have nearly disappeared in the Antelope Valley due to factors including farming, housing, and green energy development. The purpose statement of the park is "to preserve and protect an impressive area of Joshua Tree—juniper woodlands and its associated ecosystem, a landscape which was once abundant in the Antelope Valley" (CSP n.d.).



Western Joshua trees in Arthur B. Ripley Desert Woodland State Park.  
Source: California State Parks.

In August 2020, the Lake Fire burned 55 acres, primarily comprised of western Joshua tree habitat, in the southern extent of Ripley State Park. Beginning in March 2021, CSP implemented a habitat restoration project to address regeneration of western Joshua tree. In a June 2022 status report, CSP reported that Ripley State Park is steadily recovering from the fire. The report describes restoration methods, identifies the survival rate of sprouts, and recommends management actions to track the growth

rate of the trees (De Vera 2022). These findings and recommendations may be used to inform management actions in the Conservation Plan related to restoration. CSP is also seeking funding





to remove fuels and invasive species and conduct research on the effects of wildland fire on regrowth of western Joshua tree in the park.

### Red Rock Canyon State Park

Red Rock Canyon State Park was first established on 3,015 acres in Kern County. Since 1982, the park has grown to about 27,000 acres through subsequent land acquisitions and agreements. The Red Rock Canyon State Park General Plan was approved in January 1982 and most recently updated in 2023. The General Plan identifies 301 acres of Joshua tree woodland and other small stands within the park, noting that Joshua tree woodland is a sensitive natural community of high resource value and in need of protection.

The General Plan also identifies western Joshua tree as a sensitive botanical resource, noting that the park is near the western edge of the species' range in California where the population was modeled as unsustainable (Cole et al. 2011; CSP 2023).

One of the General Plan's stated goals is to restore native plant communities, including by:

- Developing science-based vegetation management objectives for habitat restoration and enhancement.
- Developing management plans in consultation with Tribes to avoid or minimize human impacts on native plant communities.
- Partnering with neighboring landowners to restore and preserve desert plant communities on a landscape scale.

Another goal of the General Plan (CSP 2023) is to protect and conserve sensitive plant species, including by:

- Implementing protection methods (e.g., habitat preservation, seed banking, restoration/enhancement, and visitor education).
- Developing and implementing protocols for locating and monitoring sensitive plant populations.
- Monitoring known populations of sensitive species over time.
- Developing sensitive species management plans.
- Planning and implementing conservation actions in collaboration with other agencies.
- Avoiding or minimizing human activities that disrupt natural ecological systems.
- Implementing management activities that improve ecological systems, such as controlling invasive species and restoring habitat.



### Saddleback Butte State Park

Saddleback Butte State Park encompasses 2,955 acres in Los Angeles County. Although CSP has not adopted a general plan for this park, the park was originally named Joshua Trees State Park and was established for the purpose of protecting Joshua tree woodlands.

The purpose statement of the park is “to make available for day use an unspoiled area of desert terrain and to preserve a representative stand of [western] Joshua Trees and associated desert flora typical of this portion of the Mojave Desert” (CSP n.d.).

### ***State Park Units Classified as State Vehicular Recreation Areas***

The following sections describe management plans relevant to western Joshua tree conservation that apply to State Vehicular Recreation Areas (SVRAs).

### Wildlife Habitat Protection Plans

Public Resources Code section 5090.32, subdivision (g) requires the Off-Highway Vehicle Division of CSP to prepare Wildlife Habitat Protection Plans (WHPPs) for lands in SVRAs within the State Parks System. Each SVRA has an existing WHPP that was developed in the 1990s and updated in 2010. Many of these plans are currently being updated in accordance with changes to the Public Resources Code (CSP 2021). After completion of these updates, WHPPs will be updated every 5 years at a minimum. Some of the updated WHPPs were approved between 2022 and 2024, while other WHPPs are still in development or pending public review and approval. In accordance with the Public Resources Code, each WHPP must include objectives for updated WHPPs to identify rare or endangered plant and animal species and their supporting habitat for sensitive area consideration; incorporate objectives that target the protection, conservation, and improvement of natural resources within SVRAs; and develop and incorporate annual monitoring programs to assess whether WHPP objectives are being met. The types of management actions that may influence western Joshua tree conservation include actions to conserve and restore soils, prevent authorized trail development in areas with existing natural communities, and restore habitat. During subsequent updates of WHPPs, CDFW will have the opportunity to collaborate with CSP on management actions to be implemented at Hungry Valley and Onyx Ranch SVRAs in support of western Joshua tree conservation.

### Soil Conservation Plans

Each SVRA is required to develop a soil conservation plan that must be reviewed every 5 years and updated as needed. Soil conservation plans must demonstrate how an SVRA complies with CSP’s 2020 Soil Conservation Standard by implementing an adaptive management framework that consists of performing assessments of OHV roads, trails, and facilities, implementing maintenance actions, and monitoring the outcome of the actions taken. Under the 2020 Soil Conservation Standard, SVRAs must manage OHV facilities for sustainable long-



term use, meaning soil loss must not exceed restorability (CSP 2020). During subsequent updates of soil conservation plans, CDFW will have the opportunity to collaborate with CSP on soil management actions to be implemented at Hungry Valley and Onyx Ranch SVRAs in support of western Joshua tree conservation.

#### Hungry Valley State Vehicular Recreation Area

Hungry Valley SVRA encompasses 19,000 acres in Los Angeles County. Providing opportunities for OHV recreation is a top priority of Hungry Valley SVRA, but the General Plan, which is currently being updated, also recognizes the recreation area's natural resources. The General Plan does not specifically discuss western Joshua tree but includes policies to protect rare, endangered, and threatened plants. CSP is currently developing a soil conservation plan for Hungry Valley SVRA, which includes measures to minimize and repair soil erosion in the recreation area. CSP is also implementing a wildlife habitat protection plan for Hungry Valley SVRA, which allows motorized vehicle use in a manner that balances natural resource protection. The plan identifies western Joshua tree as a candidate for listing under CESA and identifies Joshua tree woodland as habitat for other wildlife species in the recreation area (CSP 2024b).

#### Onyx Ranch State Vehicular Recreation Area

Onyx Ranch SVRA encompasses over 26,000 acres in eastern Kern County. A general plan has not yet been adopted for this SVRA. CSP is currently developing a soil conservation plan and a wildlife habitat protection plan for Onyx Ranch SVRA.

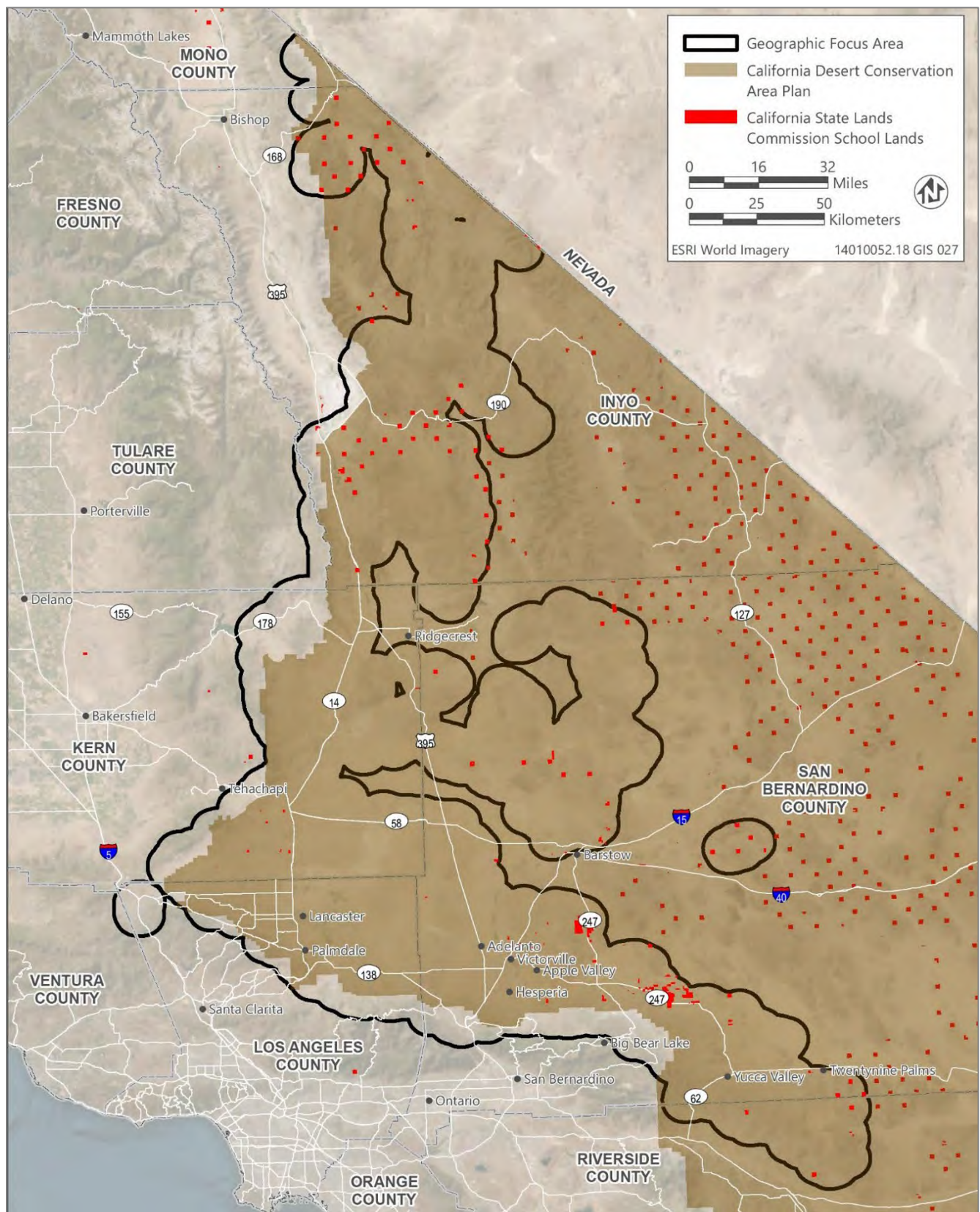
## **CALIFORNIA STATE LANDS COMMISSION**

### ***School Lands in the California Desert Conservation Area***

The California State Lands Commission (CSLC) has primary responsibility for the surface management of school lands in California. This includes the identification, location, and evaluation of the State's interest in these lands and their leasing and management. School lands are what remains of the nearly 5.5 million acres granted to California by Congress in 1853 to benefit public education (Ch. 145, 10 Stat. 244). Currently, CSLC manages approximately 468,000 acres of school lands held in fee ownership by the State, with many of these lands located in the California desert. The Commission also manages the surface and mineral ownership of hundreds of thousands of acres of school lands (CSLC 2012, n.d.). School lands make up approximately 87 square kilometers (33.6 square miles), or roughly 0.7 percent, of western Joshua tree's range in California. School lands within the geographic focus area are shown in Figure 2-14.







Source: CSLC 2024; adapted by Ascent in 2024.

**Figure 2-14 California State Lands Commission School Lands Overlapping the Geographic Focus Area**



As discussed above, DRECP was developed by the agencies in the Renewable Energy Action Team to provide effective protection and conservation of desert ecosystems while allowing for the appropriate development of renewable energy projects and promoting outdoor recreation opportunities within CDCA (refer to the “Desert Renewable Energy Conservation Plan” section above).

CSLC is the largest state agency landowner in DRECP, managing approximately 1.5 percent of the DRECP planning area. These lands form a patchwork of small parcels found throughout the DRECP planning area, mostly in San Bernardino County and Eastern Riverside County (BLM 2015).

On October 16, 2008, CSLC adopted the Resolution by the California State Lands Commission Supporting the Environmentally Responsible Development of School Lands Under the Commission’s Jurisdiction for Renewable Energy Related Projects. In this resolution, CSLC resolved that lands within its jurisdiction may be developed only with assurances that California’s unique and sensitive environments will be protected. A written MOU, executed in May 2012 between CSLC and the Department of the Interior, acting through BLM, describes the terms and procedures for land exchanges between these agencies to consolidate school lands into larger parcels suitable for commercial-scale renewable energy projects (CSLC 2008, 2012; BLM 2015).

CSLC may issue leases or permits on State Lands under its jurisdiction, including School Lands, for various types of projects (e.g., utility, highway, grazing, mineral extraction). CSLC generally serves as the lead agency for conducting environmental review under CEQA for the issuance of leases and permits on school lands. As part of the CEQA process, CSLC is required to evaluate the impacts of issuing a lease or permit on special-status species, including western Joshua tree, and to adopt mitigation measures to reduce potentially significant impacts, where feasible. For example, CSLC recently issued a general lease for a new solar energy facility in Kern County. The project was anticipated to affect lands that possess significant environmental values due, in part, to their unique display of Joshua trees. CSLC required preparation of a Joshua Tree Preservation Plan, exclusionary fencing of the western Joshua tree woodland, and annual monitoring of the species (CSLC 2023).

CSLC may also issue leases on State Lands for conservation purposes. CSLC has previously approved long-term leases (i.e., 10–20 years) to CSP and CDFW for conservation. In support of the Conservation Plan, CSLC may award additional long-term leases to CDFW to conserve land that currently supports western Joshua tree or that could serve as potential climate refugia for the species.



### ***California State Lands Commission Significant Lands Inventory***

As directed by Public Resources Code section 6370, CSLC published the *Inventory of Unconveyed State School Lands & Tide & Submerged Lands Possessing Significant Environmental Values*, also referred to as the “Significant Lands Inventory” (CSLC 1975). The report identifies lands possessing significant environmental values and the criteria by which those determinations were made, along with any recommended actions necessary for permanent protection of such identified lands. Whether land is necessary for the continued existence of a rare or endangered plant is one of several criteria for identifying lands that possess significant environmental values. Parcels that possess significant environmental values are then classified into the following categories:

- Class A: Restricted Use. Areas where public use should be minimized to preserve the integrity of the natural environment as a whole.
- Class B: Limited Use. Areas in which one or more closely related dominant, significant environmental values is present. Limited use compatible with and non-consumptive of such values may be permitted.
- Class C: Multiple Use. Areas currently in multiple use which are less susceptible to environmental degradation than are Classes A and B, but nevertheless do possess significant environmental values.

CSLC adopted regulations to assure the protection of the significant environmental values of identified lands (Cal. Code Regs., tit. 2, § 2951 et seq.). The regulations state that CSLC will not allow sale, lease, or other use of significant environmental land without (a) finding that adequate provisions have been made for the permanent protection of the significantly environmental characteristics or (b) finding that granting of the application will have no significant effect upon environmental characteristics.



*Western Joshua trees at sunset.*  
*Source: National Park Service.*





## CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

### ***Sensitive Natural Communities***

CDFW maintains a list of natural communities throughout California, which are assigned a state rank based on their rarity. Sensitive natural communities refer to natural communities with rarity ranks of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable). Joshua tree woodland (*Yucca brevifolia* Woodland Alliance) is identified as a CDFW sensitive natural community. The State rank for Joshua tree woodland is S3 (vulnerable) due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from California (CDFW 2023).

CEQA is the primary mechanism through which sensitive natural communities receive protection. CEQA requires public agencies to evaluate impacts to sensitive natural communities from projects they review, and to adopt measures to mitigate significant impacts. The Native Plant Protection Act, CESA, and ESA may also afford protections to natural communities that support rare species or are defined by the dominance or presence of such species by prohibiting unauthorized take of those species. In addition, sensitive natural communities may be protected by local regional plans, regulations, or ordinances (CDFW n.d.).

### ***State Wildlife Action Plan***

In 2005, Congress mandated that each state must develop a State Wildlife Action Plan (SWAP) every 10 years. SWAPs are designed to identify species of greatest conservation need. California's SWAP examines the health of wildlife and prescribes actions to conserve wildlife and vital habitats before they become rarer and more costly to protect. The plan also promotes wildlife conservation while furthering responsible development and addressing the needs of a growing human population. Although the focus of the SWAP is on wildlife conservation, the plan acknowledges that Joshua tree is an endemic species adapted to specialized desert habitats. Joshua trees are a focal habitat type associated with conservation targets in the desert region.

The SWAP includes conservation strategies for wildlife species that would also benefit western Joshua tree, including strategies to advocate, increase political awareness, and acquire funding for conservation of desert habitat; develop HCPs, NCCPs, and management plans to minimize impacts of development; and conserve lands through land acquisitions, easements, and leases (CDFW 2015). CDFW circulated a draft 2025 SWAP for public review on March 10, 2025. The final 2025 SWAP is anticipated to be completed by CDFW in October 2025.



### ***California Department of Fish and Wildlife Lands Program***

CDFW manages more than 1.1 million acres of land spanning more than 700 properties statewide. These lands comprise ecological reserves, wildlife areas, undesignated lands, public access areas, fish hatcheries, and miscellaneous lands. Of these, approximately 700,000 acres are owned in fee title, and approximately 483,000 acres are administered through written MOUs, leases, easements, or management agreements under the CDFW Lands Program (CNRA 2023). The CDFW Lands Program's mission is to ensure that California's lands are managed and maintained to provide optimal benefits for fish, wildlife, and plants by:

- Developing uniform, statewide policies and planning guidance relative to the acquisition, protection, restoration, enhancement, and management of lands.
- Providing statewide policy and programmatic coordination with conservation groups and local, state, and federal resource agencies to conserve privately owned lands.
- Developing uniform guidelines and regulations for public use and land management plans that focus on the needs of fish, wildlife, and plants.
- Providing budgetary and technical assistance to regional land managers.
- Fostering public use, knowledge, and enjoyment of lands.

CDFW lands within the geographic focus area are shown on Figure 2-13. Approximately 34 square kilometers (13.1 square miles), or 0.3 percent, of western Joshua tree's range in California is distributed within CDFW lands. The ecological reserves within western Joshua tree's range in California, which together comprise approximately 28 square kilometers (10.8 square miles), or 0.2 percent, are listed in Table 2-5. CDFW has not adopted land management plans for these ecological reserves. Approximately 5 square kilometers (1.9 square miles), or less than 0.1 percent, of CDFW land within western Joshua tree's range in California are held under conservation easements. Other CDFW lands within western Joshua tree's range in California include a mitigation property, a regional park, a fish hatchery, and public river access. Combined, these areas make up less than 0.4 square kilometer (98.8 acres), or less than 0.1 percent, of western Joshua tree's range in California.



**Table 2-5 Ecological Reserves in Western Joshua Tree Range in California**

| Ecological Reserve                | County         | Ecological Reserve Area in Square Kilometers (sq mi) | Range in Square Kilometers (sq mi), Percent of Range (%) | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------|----------------|------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| West Mojave Ecological Reserve    | San Bernardino | 72.8 (28.1)                                          | 18.8 (7.3),<br>0.1                                       | This reserve was acquired for the purpose of preserving a representative portion of the West Mojave Desert, protecting desert tortoise ( <i>Gopherus agassizii</i> ) and Mojave ground squirrel ( <i>Xerospermophilus mohavensis</i> ) habitat, and protecting it from the damaging influences of OHV use and sheep grazing. The dominant vegetation in the reserve is white bur-sage ( <i>Ambrosia dumosa</i> ). Creosote bush is also abundant but not as evenly distributed. |
| Canebrake Ecological Reserve      | Kern           | 29.1 (11.2)                                          | 5.0 (1.9),<br><0.1                                       | The Reserve contains valley foothill riparian, valley foothill hardwood-conifer/blue oak-foothill pine, sagebrush, western Joshua tree, riverine, lacustrine, fresh emergent wetland, wet meadow, pasture, and cropland.                                                                                                                                                                                                                                                        |
| Fremont Valley Ecological Reserve | Kern           | 16.6 (6.4)                                           | 4.2 (1.6),<br><0.1                                       | The Reserve was acquired for the purpose of protecting desert tortoise habitat. The reserve consists of typical northwest Mojave Desert terrain, and the natural vegetation community is primarily creosote bush scrub.                                                                                                                                                                                                                                                         |
| King Clone Ecological Reserve     | San Bernardino | 2.0 (0.8)                                            | 0.5 (0.2),<br><0.1                                       | This reserve was acquired for the purpose of protecting ancient creosote rings in the Mojave Desert. The Reserve consists of a predominantly flat, level area with creosote bush scrub.                                                                                                                                                                                                                                                                                         |

Notes: OHV = off-highway vehicle; sq mi = square miles.

Sources: Esque et al. 2023; CAL FIRE 2024; CSP 2024a; GreenInfo Network 2024; data provided by CDFW in 2024; compiled by Ascent in 2024.

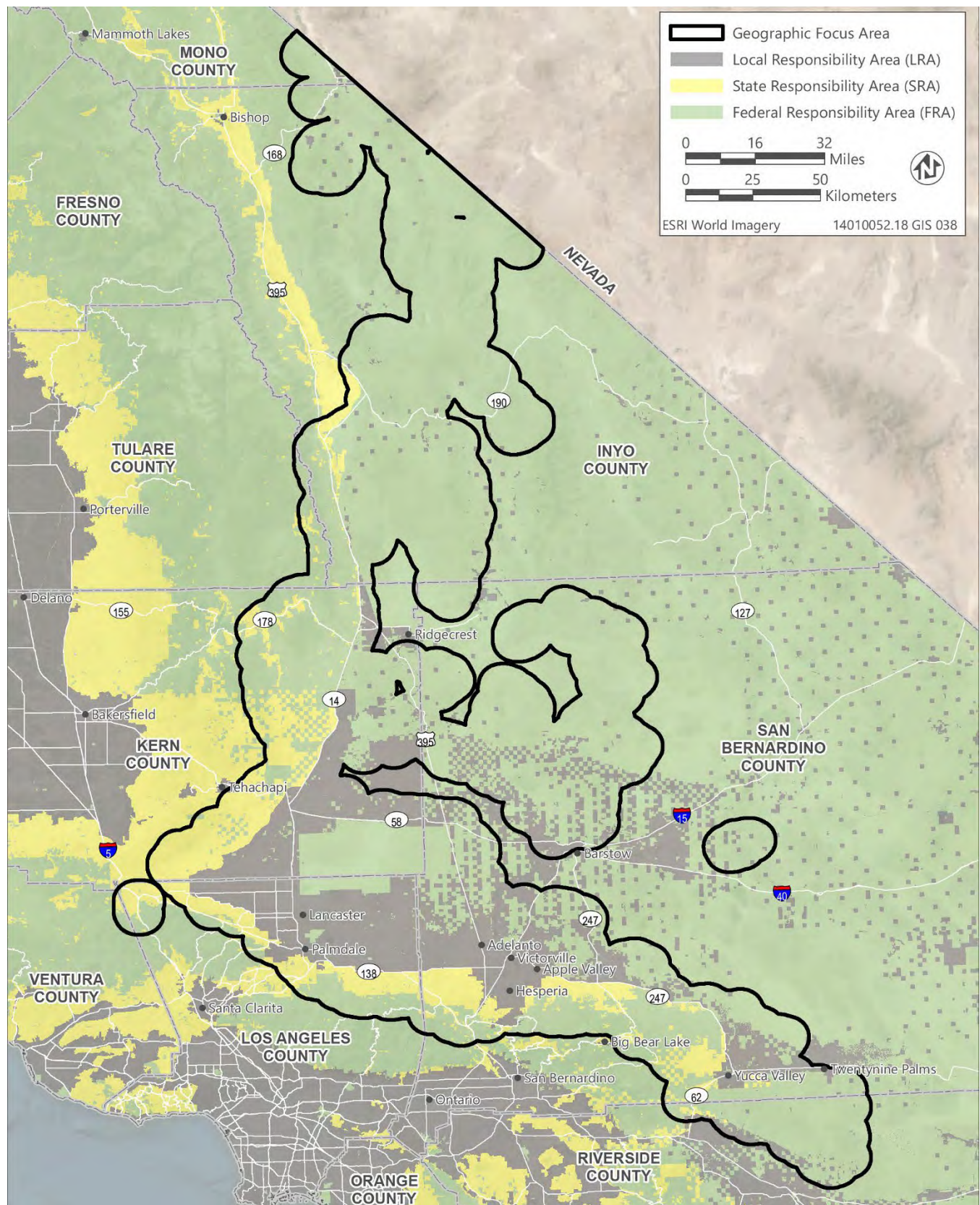
## CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION

The California Department of Forestry and Fire Protection (CAL FIRE) is responsible for wildland fire prevention, risk reduction, and response on behalf of the State across lands not covered by local fire districts or by federal agencies (i.e., the State Responsibility Area) and in certain local jurisdictions through intergovernmental contracts. The CAL FIRE State Responsibility Area is shown in Figure 2-15.

Approximately 14 percent of the western Joshua tree range in California is within the State Responsibility Area. In the State Responsibility Area, CAL FIRE's fire suppression objective is to provide aggressive initial attack on all wildland fire to minimize resource loss.







Source: CAL FIRE 2023; adapted by Ascent in 2024.

**Figure 2-15 Federal, State, and Local Responsibility Areas for Fire Response Overlapping the Geographic Focus Area**



CAL FIRE also supports and encourages fuel treatment before an incident occurs to reduce wildland fire risk, including the use of prescribed fire as a management tool on forest and rangelands, as well as for wildlife habitat improvement, watershed protection, reforestation, and range and livestock management. Further discussion regarding fire protection, natural resource management, and fire prevention methods within western Joshua tree's range in California and climate refugia, including fire suppression and fuel treatments, is found in Sections 5.2.2, "Land Conservation and Management," and 5.2.4, "Research to Inform Long-Term Conservation."

## CALIFORNIA WILDLIFE CONSERVATION BOARD

The California Desert Conservation Act (Fish & G. Code, § 1450 et seq.) became effective on January 1, 2022, and established a California Desert Conservation Program under the administration of the Wildlife Conservation Board. The purpose and goal of the California Desert Conservation Program include the following:

- Protect, preserve, and restore the natural, cultural, and physical resources of the "portions of the Mojave and Colorado Deserts region," as defined in Fish and Game Code section 1452, subdivision (f), in California through the acquisition, restoration, and management of lands.
- Promote the protection and restoration of the biological diversity of the region.
- Provide for resilience in the region to climate change.
- Protect and improve air quality and water resources within the region.
- Undertake efforts to enhance public use and enjoyment of lands owned by the public.

Federal and state agencies, local public agencies, tribes, and NGOs with tax exempt status under United States Code title 26, section 501, subdivision (c)(3) are eligible to apply for grant funding under the program for acquisition, restoration, and management projects (Fish & G. Code, §§ 1452, subd. (d) & 1456, subd. (c)). Although the California Desert Conservation Program does not specifically target the conservation of any individual species, the program could contribute to the conservation or restoration of western Joshua tree habitat in California (WCB n.d.).

## 2.4 TRIBAL CO-MANAGEMENT

This section describes laws and policies that provide for CDFW communication, consultation, and co-management with Tribes. WJTCA provides requirements regarding western Joshua tree co-management with Tribes in Fish and Game Code section 1927.6, subdivisions (a) and (b), listed below.





- CDFW shall develop and implement a western Joshua tree conservation plan in collaboration with the Commission, governmental agencies, Tribes, and the public (Fish & G. Code, § 1927.6, subd. (a)).
- When developing the conservation plan, CDFW shall consult with Tribes, include co-management principles in the plan, provide for the relocation of western Joshua trees to tribal lands upon a request from a Tribe, and ensure Traditional Ecological Knowledge is incorporated into the plan (Fish & G. Code, § 1927.6, subd. (b)).
- This section shall not preclude CDFW from entering into memorandum of understanding with Tribes to provide for the taking and possession of western Joshua trees for tribal cultural purposes, or as otherwise required by applicable law (Fish & G. Code, § 1927.2, subd. (h); see Section 6.4, “Tribal Co-Management”).

Tribal lands referenced in Fish and Game Code section 1927.6, subdivision (b) above include all of the following: (1) lands meeting the definition of “Indian country” in United States Code, title 18, section 1151 held in trust by the United States for the benefit of either Tribes (rancherias/reservations) or tribal members (individual allotments usually within rancherias/reservations); (2) fee lands held by Tribes (land purchased and owned by a Tribe typically outside of rancherias/reservations); or (3) fee lands held by tribal-led NGOs (e.g., NALC) or NGOs formed by non-federally recognized Tribes to act on a Tribe’s behalf as an entity to hold land.



Source: Ryan Hall.

### 2.4.1 State Tribal Communication and Consultation Policy

State agencies and Tribes engage in consultation regarding policies, processes, programs, and projects that have the potential to affect tribal interests. Executive Order (EO) B-10-11, issued by Governor Edmond G. Brown, Jr., on September 19, 2011, states that it is the policy of the administration that every state agency and department subject to executive control shall encourage communication and consultation with Tribes. EO B-10-11 reaffirms the right for Tribes to exercise sovereign authority over their members and territory, recognizes that the State and Tribes are better able to adopt and implement mutually beneficial policies when they cooperate and engage in meaningful consultation, and identifies the State’s commitment to strengthening and sustaining effective government-to-government relationships between the State and the Tribes. EO B-10-11 also created the Office of the Tribal Advisor, which, among other things, is directed to facilitate communication and consultations





between Tribes and state agencies. Pursuant to EO B-10-11, California Natural Resources Agency (CNRA), CDFW, and the Commission developed the following policies:

- CNRA adopted its Tribal Consultation Policy on November 20, 2012 (CNRA 2012). The Tribal Consultation Policy directs CNRA departments to conduct outreach to Tribes and designate a tribal liaison to serve as the central point of contact for Tribes. CNRA is currently updating its Tribal Consultation Policy to reflect additional consultation requirements established by new laws and executive orders that have been enacted subsequent to 2012. This updated Tribal Consultation Policy will become the new framework for all CNRA departments, which may develop supplemental policies specific to their authorities.
- CDFW adopted its Tribal Communication and Consultation Policy on October 2, 2014 (CDFW 2014). The Policy establishes guiding principles and directs CDFW to appoint a tribal liaison. CDFW is committed to consulting with Tribes about issues surrounding California's fish, wildlife, and plant resources, assessing the potential effects of CDFW activities on tribal interests, and providing Tribes with meaningful opportunities to participate in decision-making processes that have the potential to affect tribal interests.
- The Commission adopted its Tribal Consultation Policy on June 10, 2015, to effectively work with Tribes to sustainably manage natural resources of mutual interest. Several years of an iterative and collaborative processes to develop a shared vision between tribal entities and the Commission resulted in the following vision statement and definition of co-management (Commission 2017, 2020):
  - "The vision of Tribes, the California Fish and Game Commission, and the California Department of Fish and Wildlife is to engage in a collaborative effort between sovereigns to jointly achieve and implement mutually agreed upon and compatible governance and management objectives to ensure the health and sustainable use of fish and wildlife."
  - Co-management is defined as "a collaborative effort established through an agreement in which two or more sovereigns mutually negotiate, define, and allocate amongst themselves the sharing of management functions and responsibilities for a given territory, area or set of natural resources."



EO N-15-19, issued by Governor Gavin Newsom on June 18, 2019, acknowledges and apologizes on behalf of the State for the prejudicial policies and maltreatment of Tribes and commends California Native Americans for stewarding and protecting lands within California. This EO also reaffirms and incorporates by reference the principles of government-to-government engagement established by EO B-10-11.

EO N-82-20, signed by Governor Gavin Newsom on October 7, 2020, creates a California Biodiversity Collaborative and sets a goal of conserving at least 30 percent of the State's land and coastal waters by 2030 to combat the biodiversity and climate crises. This EO acknowledges that California Native Americans have stewarded and managed the lands within California and that addressing the biodiversity and climate crises requires partnerships and collaboration with Tribes.



Young western Joshua tree.  
Source: National Park Service.

Section 1.3.2, "California Native American Tribes," and Appendix C, "Tribal Input Summary Memo," of the Conservation Plan include a summary of CDFW's tribal outreach and consultation efforts to-date during development of this Conservation Plan.

### 2.4.2 Statement of Administration Policy: Native American Ancestral Lands

In September 2020, Governor Newsom issued a Statement of Administration Policy stating that it is the policy of the administration to "seek opportunities to support California Native American tribes' co-management of and access to natural lands that are within a California Native American tribe's ancestral land and under the ownership or control of the State of California." The purposes of this policy are to partner with Tribes to facilitate tribal access to, use of, and co-management of state-owned or state-controlled natural lands and to work cooperatively with Tribes that are interested in acquiring natural lands in excess of state needs to:

- Support tribal self-determination and self-government.
- Facilitate the access of Tribes to sacred sites and cultural resources.
- Improve the ability of Tribes to engage in traditional and sustenance gathering, hunting, and fishing.



- Partner with Tribes on land management and stewardship utilizing Traditional Ecological Knowledge.
- Reduce fractionation of tribal lands.
- Provide opportunities for education, community development, economic diversification, and investment in public health, investment in information technology and infrastructure, renewable energy, water conservation, and cultural preservation or awareness.

Examples of actions that could be taken in accordance with this policy are:

- Entering into a written MOU or other written agreements, or adopting policies and practices to allow for access to or co-management of natural lands under the ownership or control of the State with Tribes with ancestral lands located in such areas.
- Coordinating with local governments to zone natural land in excess of state needs in a way conducive to tribal access and use.
- Granting funding to assist Tribes with procurement, protection, or management of natural lands located within their ancestral territories, subject to available resources.
- When natural lands under the ownership or control of the State are in excess of state needs, working cooperatively within existing statutory and regulatory frameworks with Tribes that have ancestral territory within those lands and are interested in acquiring them, including by prioritizing tribal purchase or transfer of land.

### **2.4.3 Assembly Bill 1284: Tribal Co-Governance and Co-Management**

Enacted in September 2024, Assembly Bill 1284 allows for the co-governance and co-management of tribal ancestral lands and waters in California. The bill encourages the CNRA and its departments, conservancies, and commissions to enter into co-governance and co-management agreements with federally recognized Tribes. In addition, the bill authorizes the California Natural Resources Secretary or a delegate to enter into agreements with federally recognized Tribes for the purposes of shared responsibility, decision-making, and collaboration in resource management and conservation within a Tribe's ancestral lands and waters, and requires the Secretary or a delegate to be the signatory for the State for these agreements. The bill also authorizes the Secretary or a delegate, within 90 days of a federally recognized Tribe's request, to begin government-to-government negotiations on co-governance and co-management agreements with the Tribe.



#### **2.4.4 Senate Bill 310: Cultural Burning**

Enacted in September 2024, Senate Bill 310 authorizes the California Natural Resources Secretary, in consultation with its departments, commissions, boards, conservancies, and other entities, to enter into written agreements with federally recognized Tribes in support of tribal sovereignty with respect to cultural burning in their ancestral territories. In deference to tribal sovereignty, the Secretary may agree in a written agreement that compliance with specified state permitting or regulatory requirements is not required for cultural burning. The bill also authorizes local air districts to enter into written agreements with federally recognized Tribes in support of tribal sovereignty with respect to cultural burning in their ancestral territories.

#### **2.4.5 Tribal Stewardship Strategy Toolkit**

The CNRA is developing a Tribal Stewardship Strategy Toolkit that will provide policies and resources to advance shared goals of Tribes and the State for improved tribal access and co-management of public places and natural resources and the return of ancestral lands to tribal ownership. Example projects already undertaken by departments within CNRA include entering into memorandums of understanding to open state lands for tribal ceremonies, gathering, and use; returning land to Tribes; and providing funds to Tribes to support their wildland fire resilience and forestry management priorities (CNRA 2024).

#### **2.4.6 The Advisory Council on Historic Preservation**

The Advisory Council on Historic Preservation has adopted a policy statement on indigenous knowledge and historic preservation, which was requested to be included in the Conservation Plan by tribal members who contributed to the Conservation Plan (FII CPI, pers. comm., 2024). The Advisory Council on Historic Preservation provides foundational commitments that are important for guiding development of co-management principles with Native Americans who inhabit land in the United States (ACHP 2024). CDFW developed initial foundational commitments based on recommendations from tribal members in Action TCM 1, which are described in Section 5.2.3, "Tribal Co-Management," and in Appendix G, "Foundational Commitments by CDFW for Developing Western Joshua Tree Conservation Plan Co-Management Principles with California Native American Tribes."

#### **2.4.7 Joshua Tree National Park Co-Management Agreement**

In November 2022, the Twenty-Nine Palms Band of Mission Indians entered into a co-management agreement with Joshua Tree National Park that allows for continued cooperation between the two entities and outlines a path toward shared stewardship of park resources. Through this agreement, the Twenty-Nine Palms Band of Mission Indians and Joshua





Tree National Park identified critical areas for collaboration, which include trail development, emergency mutual aid, joint planning on educational and interpretive activities, and other programs (NPS 2023). This co-management agreement can serve as an example for future co-management agreements between CDFW and Tribes.

## 2.5 LOCAL GOVERNMENT

### 2.5.1 County and City Plans, Policies, and Ordinances

Approximately 37.8 percent of western Joshua tree's range in California is within areas of land use control and authority of local agencies (i.e., county and city jurisdictions). This category includes county- and city-owned lands, some of which are protected parks, preserves, and sanctuaries. Table 2-6 lists the counties and cities that have western Joshua trees in their jurisdiction and identifies the area and percentage of the species' range in California within each jurisdiction. For each county listed, the area and percentage of western Joshua tree's range in California is limited to unincorporated areas within the county and excludes federal and state lands. The counties and cities within the geographic focus area are shown on Figure 2-16. Figure 2-16 does not include federal and state lands, which are included in Figure 2-4 in Section 2.3.3 and Figure 2-13 in Section 2.3.4.

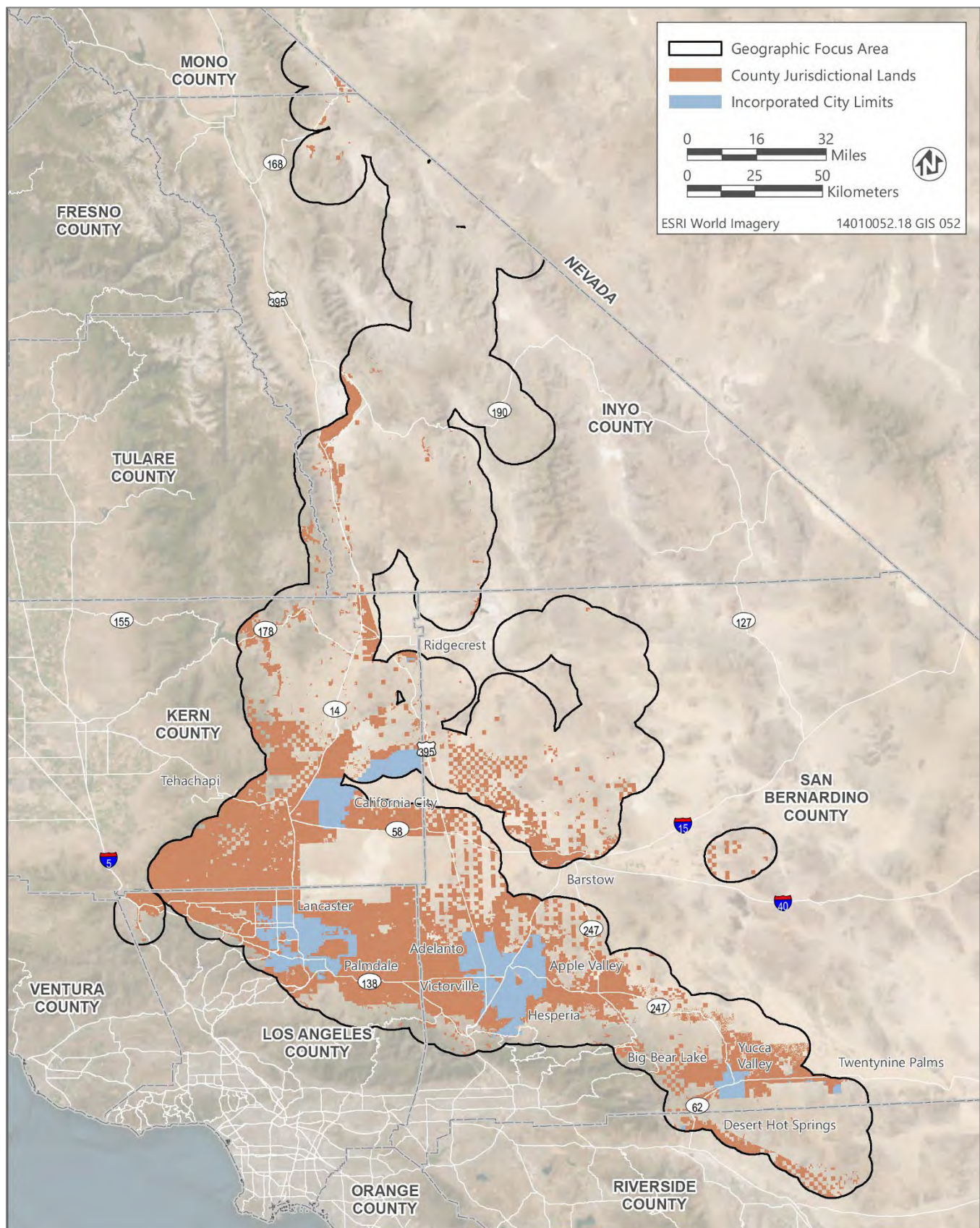


*Mojave yuccas in front of a western Joshua tree.*

Source: National Park Service.







Source: Data provided by CDFW in 2024; adapted by Ascent in 2024.

**Figure 2-16 County and City Jurisdictional Land within the Geographic Focus Area**





**Table 2-6 City and County Jurisdictions in Western Joshua Tree Range in California**

| Jurisdiction            | Range in Square Kilometers (sq mi) | Percent of Range (%) |
|-------------------------|------------------------------------|----------------------|
| San Bernardino County   | 1,741 (672.2)                      | 13                   |
| Kern County             | 1,011 (390.3)                      | 8                    |
| Los Angeles County      | 989 (381.9)                        | 8                    |
| City of Hesperia        | 144 (55.6)                         | 1.1                  |
| City of Adelanto        | 120 (46.3)                         | 0.9                  |
| City of Victorville     | 119 (45.9)                         | 0.9                  |
| City of Palmdale        | 117 (45.2)                         | 0.9                  |
| Town of Apple Valley    | 98 (37.8)                          | 0.7                  |
| Inyo County             | 53 (20.5)                          | 0.4                  |
| Town of Yucca Valley    | 93 (35.9)                          | 0.7                  |
| City of California City | 70 (27.0)                          | 0.5                  |
| City of Lancaster       | 56 (21.6)                          | 0.4                  |
| Riverside County        | 4 (1.5)                            | <0.1                 |
| Mono County             | <1 (<0.4)                          | <0.1                 |

Notes: sq mi = square miles.

Sources: Esque et al. 2023 ;data provided by CDFW in 2024; compiled by Ascent in 2024.

Article XI of the California Constitution sets forth the powers of local governments. Local agencies govern land use planning within their jurisdictions, including by adopting ordinances, zoning regulations, and general plans. Although state laws and regulations protecting biological resources preempt those of local governments, local agencies can adopt ordinances, regulations, and policies that describe how the agency will implement state requirements, support the State's objectives, and reinforce the State's priorities at the local level. Local agencies have the ability to adopt more stringent ordinances and regulations, provided they do not conflict with state laws. Local agencies also have the ability to make changes to their ordinances, regulations, and policies in response to changing conditions and regulatory environments.

Many counties and cities within western Joshua tree's range in California have adopted policies in their general plans that align with state and federal laws governing the protection of biological resources. Such policies include designating Joshua tree woodland as a sensitive natural community, designating sensitive areas where development must be carefully planned or where development is discouraged or prohibited, coordinating with land management agencies to protect biological resources, protecting special-status species, acquiring mitigation lands and preserving those lands as open space, and educating the public about natural resources. Many general plans also include policies that provide a framework for the local agency to coordinate with CDFW to implement the requirements of CESA at the local level.



Many counties and cities within western Joshua tree's range in California have also adopted ordinances that regulate tree maintenance and removal, with some ordinances providing specific requirements applicable to western Joshua tree. As applied to western Joshua tree, some of these local ordinances are currently preempted by WJTCA and CESA, given the protections afforded by these statutes, and will continue to be preempted if the species is listed under CESA. However, WJTCA allows local agencies to adopt measures that provide additional protections beyond those required under the act (Fish & G. Code, § 1927.11).

WJTCA allows CDFW to enter into an agreement with any county or city to delegate the ability to authorize, by permit, the taking of a western Joshua tree associated with developing single-family residences, multifamily residences, accessory structures, and public works projects, provided certain conditions are met (Fish & G. Code, § 1927.3). Fish and Game Code section 1927.3, subdivision (c)(3) specifies limits on the number of individual western Joshua trees that a project may take pursuant to a permit issued under a county or city's delegated authority, depending on the project type, and requires CDFW's concurrence that certain projects have avoided and minimized the take of western Joshua trees to the maximum extent practicable. To receive this limited delegation of authority, a county or city must adopt an ordinance requiring the satisfaction of all requirements in Fish and Game Code section 1927.3 as a condition of approval for any take permit issued under such authority (Fish & G. Code, § 1927.3, subd. (c)(1)). In addition, counties and cities are responsible for ensuring that permittees satisfy those requirements (Fish & G. Code, § 1927.3, subd. (c)(2)). Fish and Game Code section 1927.3, subdivision (c)(4) also directs counties and cities to collect fees for permits issued and to remit the fees to CDFW.

CDFW may also enter into an agreement with any county or city to delegate the ability to authorize, by permit, the removal or trimming of dead western Joshua trees or the trimming of live western Joshua trees that pose a risk to structures or public health and safety, provided certain conditions are met (Fish & G. Code, § 1927.4, subd. (b)). To receive this limited delegation of authority, counties and cities must ensure the requirements of Fish and Game Code section 1927.4, subdivision (a) are met and must comply with specific reporting requirements (Fish & G. Code, § 1927.4, subd. (b)).

The Conservation Plan can also provide a framework for CDFW to enter into a written MOU or other agreement with counties and cities to designate protected areas for western Joshua tree. For example, Inyo County designates large contiguous areas in the County known for containing sensitive natural communities or supporting special-status species as environmental resource areas. Policy BIO-1.4 in the *Inyo County General Plan* (Inyo County 2001) discourages development in environmental resource areas unless adverse effects to sensitive resources can be mitigated to a less-than-significant level. The *Inyo County General Plan* recognizes Joshua tree woodland as sensitive natural community that occurs within the County. Similarly, Los



Angeles County officially designates areas with irreplaceable biological resources as significant ecological areas. Although western Joshua tree receives protection under the County's significant ecological areas ordinance, this ordinance is currently preempted by WJTCA. There is potential for CDFW to work with Inyo and Los Angeles Counties to designate western Joshua tree habitat, including climate refugia, as environmental resource areas and significant ecological areas, respectively. In addition, there is potential for CDFW to work with other counties and cities to designate western Joshua tree habitat, including climate refugia, within their respective jurisdictions. A written MOU or other agreement could also include programs to protect western Joshua tree, such as "adopt-a-tree" programs by which the public can participate in restoration and stewardship activities (Section 5.3.5, "Education and Awareness").

Approximately 25 percent of the western Joshua tree range in California is within the Local Responsibility Area for fire response (Figure 2-15). County and city fire departments and local fire districts have primary responsibility for preventing and suppressing fires in the Local Responsibility Area. Local fire departments generally serve developed areas and are primarily concerned with protecting the communities they serve. However, there are opportunities for CDFW to collaborate with local fire departments on fire management strategies that benefit western Joshua tree on private land.

## 2.5.2 Utilities and Special Districts

Approximately 0.2 percent of the western Joshua tree's range in California is within lands owned by the public utilities and special districts described below.

- Mountains Recreation and Conservation Authority is an open space district dedicated to the acquisition, preservation, and protection of open space wildlife habitat, and urban, mountain, and river parkland that is easily accessible to the public.
- Apple Valley Recreation and Park District provides recreation in the Town of Apple Valley.
- Hesperia Recreation and Park District provides parks and recreation facilities to the residents of the City of Hesperia and portions of the unincorporated areas of Oak Hills, Summit Valley, and Phelan.
- Antelope Valley Union High School District provides public education in the cities of Palmdale and Lancaster.



*A long-lived western Joshua tree.*

*Source: National Park Service.*



- Joshua Tree Park and Recreation District provides recreation for the residents of the unincorporated areas of Joshua Tree and neighboring communities of the Morongo Basin.
- Lancaster Cemetery District operates a cemetery that serves residents of the Antelope Valley.
- Littlerock Creek Irrigation District is a public water utility that provides water for agricultural use for the surrounding areas of Littlerock.
- Morongo Valley Community Services District is a community service district for parks, streetlights, and fire protection in Morongo Valley.
- Palmdale Water District is a public water utility that provides water within the City of Palmdale's planning area.
- Phelan Piñon Hills Community Services District provides water, parks and recreation, solid waste, and street lighting services in the desert foothills of the eastern San Gabriel Mountains in unincorporated San Bernardino County.
- Los Angeles Department of Water and Power is a municipal utility that provides water and electricity within the City of Los Angeles and several adjacent cities and communities in southwestern Los Angeles County.

In addition to the list above, there are many non-landowning special districts responsible for implementing public infrastructure projects within service areas that overlap the western Joshua tree range. Although not a comprehensive list, some of these special districts are Mojave Water Agency, Bighorn-Desert View Water Agency, Hi-Desert Water District, Joshua Basin Water District, Twentynine Palms Water District, Mission Springs Water District, and San Geronio Pass Water Agency. Many of the public infrastructure projects carried out by these special districts are state-mandated and/or related to public safety. Public agencies and publicly or investor-owned utilities were previously exempt from obtaining permits under the California Desert Native Plants Act for removal of western Joshua tree when acting in obligation to provide public service (Cal. Food & Agri. Code, § 80117). However, these utilities and special districts are now required to seek take authorization for removal of western Joshua tree under either CESA or WJTCA while western Joshua tree is a candidate species under CESA.

## 2.6 NONGOVERNMENTAL ORGANIZATIONS

Approximately 0.8 percent of the western Joshua tree's range in California is within lands owned or held in easements by the NGOs, which are described below.

- The Wilderness Land Trust is an NGO whose mission is to acquire and transfer private lands to public ownership to complete designated and proposed wilderness areas or directly protect wilderness values.



- The Transition Habitat Conservancy is a land trust whose mission is to protect transition zones and wildlife corridor ecosystems and their scenic, agricultural, and cultural resource values in the West Mojave Desert.
- The Wildlands Conservancy is an NGO whose mission is to preserve lands and provide programs for public recreation.
- The National Audubon Society is an NGO whose mission is to conserve and restore natural ecosystems, focusing on birds, other wildlife, and their habitats.
- The Mojave Desert Land Trust is an NGO that acquires and permanently protects ecologically significant land throughout the California desert, with a focus on parcels within national parks and preserves, wilderness areas, areas of critical environmental concern, and wildlife corridors.
- The Boys and Girls Club of America is an NGO that provides programs and services for young people, including after-school programs, summer camps, sports and recreation programs, academic enrichment programs, and character development programs.
- The Sequoia Riverlands Trust is an NGO that conserves natural and agricultural lands of the Southern Sierra Nevada and San Joaquin Valley.
- The Tejon Ranch Conservancy is an NGO that works to preserve, enhance, and restore the native biodiversity and ecosystem values of the Tejon Ranch and Tehachapi Range.
- The Wildlife Heritage Foundation is a statewide, nongovernmental land trust that is currently preserving over 100,000 acres of ecologically significant land and water resources.
- The Native American Land Conservancy is an NGO that acquires, preserves, and protects off-reservation sacred sites in California's ancestral territories. Western Joshua trees are present on Coyote Hole and the Bob Rabbit wildlife corridor, which are owned and managed by the Native American Land Conservancy.
- The Antelope Valley Conservancy is an NGO whose mission is the acquisition and stewardship of native habitats, watershed resources, and lands that offer community value.

These NGOs offer important planning influences because they were established primarily to protect land or provide recreation opportunities and conservation activities. The Conservation Plan presents an opportunity for CDFW to work with these nongovernmental conservancies and trusts to acquire land for conservation or implement additional protective measures on existing conservation lands for the benefit of western Joshua tree. Such measures could potentially also be applied to conservation easements on lands NGOs manage as easement holders.







### 3 TRADITIONAL VALUES AND USES OF WESTERN JOSHUA TREE BY CALIFORNIA NATIVE AMERICAN TRIBES

This chapter provides an overview of California Native American tribes' (Tribes) traditional uses of Joshua trees (i.e., western Joshua tree and/or eastern Joshua tree [*Yucca jaegeriana*]), as well as traditional values and collective experience and knowledge, known as Traditional Ecological Knowledge (TEK), related to Joshua trees. TEK has been defined in many different ways as part of federal or state policy making, often based on consultation with Native American tribes.

USFWS describes TEK as “evolving knowledge acquired by Native and local peoples over hundreds or thousands of years through direct contact with the environment. . . TEK is an accumulating body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (human and non-human) with one another and with the environment. TEK encompasses the world view of Native people which includes ecology, spirituality, human and animal relationships, and more” (Rinkevich et al. 2011). TEK is collectively shared and transmitted and can take several forms, including stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local language, and agricultural practices, including the development of plant species and animal breeds (Secretariat of the Convention of Biological Diversity 2021). TEK may embody aspects of spirituality, ceremonies, health, vitality, human and wildlife relationships, ecology, and more. It also guides habitat and plant management that complements non-native scientific understanding of agriculture, fisheries, health, horticulture, forestry, cultural identity, and

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*“TEK is an accumulating body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (human and non-human) with one another and with the environment.”*

*-Rinkevich et al. 2011*

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more (Rinkevich et al. 2011). While the origin of TEK is from previous generations, its application now is a part of contemporary landscape management science.

The sources used to inform the chapter include information gathered from tribal engagement and consultation with individual California Native American tribes during the preparation of the Conservation Plan, as described in Section 1.3.2, “California Native American Tribes.” Information referenced in this chapter that was received from a Tribe has been approved by the providing Tribe for public disclosure. Additional sources used to inform the chapter include available secondary materials related to California Native American tribes and their uses of Joshua tree. The secondary materials that help inform this chapter are not exhaustive sources in the published literature, and they may not necessarily provide a complete representation of California Native American tribes and their use of Joshua tree. Only published literature, references, and materials that are currently and publicly available were consulted as secondary sources. Tribal names and ethnographic/linguistic Native American groups are denoted as they were used in each article and may not coincide with, or be representative of, modern Tribe names. If a Tribe or Tribes present new information or alternative representations of the information they would like included in this chapter, CDFW will work to incorporate the information into future updates of the Conservation Plan.



Source: Native American Land Conservancy.

Most published literature about California Native American tribes’ use of Joshua tree does not distinguish between eastern Joshua tree and western Joshua tree because the taxonomic distinction of the two species occurred only recently. For purposes of this chapter, the general term “Joshua tree” is therefore used. In addition, the more generalized “yucca” naming convention is found mostly in early historical and anthropological references, where discussion of “yucca” included Joshua tree, as well as a broader group of shrub-like yucca plant

species, such as banana yucca (*Yucca baccata*), chaparral yucca (*Hesperoyucca whipplei*, which was previously *Yucca whipplei*), and Mojave yucca (*Yucca schidigera*). Thus, this chapter uses the term “yucca” or “yucca species” when information is not known to be specific to Joshua tree.

As stated in Section 1.3.2, the collaborative engagement process with California Native American tribes is ongoing and will evolve over time. The information in this chapter will be updated with additional tribal consultation and input shared and approved by Tribes in future



versions of the Conservation Plan. California Native American tribes that requested to review a preliminary draft of the Conservation Plan prior to CDFW submittal to the Commission were provided the opportunity. Tribes may provide comments on that preliminary draft and may also provide comments on the publicly released draft Conservation Plan through the review process outlined on the Commission's website. Tribal input will continue to be welcomed at any time by CDFW during Conservation Plan implementation (which is called for in Management Action TCM 1, "Establish Co-Management Principles" in Section 5.2.3, "Tribal Co-Management"), and for incorporation into future Conservation Plan updates.

### 3.1 CALIFORNIA NATIVE AMERICAN TRIBES COLLABORATING ON THE CONSERVATION PLAN

CDFW notified and invited input from 170 federally and non-federally recognized tribal contacts and representatives during preparation of the draft Conservation Plan. The following Tribes have met with or provided information to CDFW or Native American Land Conservancy (NALC), some of which is incorporated into the Conservation Plan. As additional California Native American tribes provide contributions to the Conservation Plan, they will be added to the following list in future Conservation Plan updates.

- Agua Caliente Band of Cahuilla Indians (ACBCI)
- Agua Caliente Tribe of Cupeño Indians (ACTCI)
- Cahuilla Band of Indians (Chahuilla)
- Fernandeño Tataviam Band of Mission Indians (FTBMI)
- Fort Independence Indian Community of Paiute Indians (FIICPI)
- Fort Yuma Quechan Indian Tribe (FYQIT)
- Kern Valley Indian Community (KVIC)
- Kwaaymii Laguna Band of Indians
- Lone Pine Paiute-Shoshone Tribe (LPPSR)
- San Manuel Band of Mission Indians (SMBMI)
- Tübatulabals of Kern Valley (Tübatulabals)
- Tule River Indian Tribe

### 3.2 TRIBAL VALUES RELATED TO, AND USES OF, JOSHUA TREE

This section is based on information contributed by California Native American tribes in meetings held during the development of the Conservation Plan and published literature. Descriptions of values and uses provided by secondary materials are sometimes referenced in the past tense because they originate from previously documented sources that interpret or describe Native American values and uses. Tribes have verified and approved the use of secondary material cited in this section during meetings with CDFW and NALC for the Conservation Plan, and additional source material may be identified by Tribes in the future.





Joshua tree is called many names by California Native American tribes that have interacted with the plant (Collins et al. 2022). Yucca species, such as Joshua tree, have been documented for their use in traditional materials and for culinary and medical purposes in the Mojave Desert and throughout the rest of Joshua tree's range in California (Collins et al. 2022). In addition, silhouette images of Joshua trees carry cultural significance in some traditional stories (FTBML, pers. comm., 2024), have significant historical value as part of the traditional cultural landscape, and serve as witnesses to the pre-colonial contact age (FICPI, pers. comm., 2024).

An ethnobotanical study by Stoffle et al. (1990) analyzed holistic conservation theory and plant-specific interviews with representatives from Western Shoshone, Southern Paiute, and Owens Valley Paiute Tribes from the Mojave Desert and Great Basin to develop a ranking system of cultural significance of various plants. Importance given to plants was based on the number of plant elements used by Tribes. Due to the various tribal uses of Joshua tree for its seeds, flowers, roots, and fibers, Joshua tree ranked high in overall cultural importance across the represented Tribes in the study within Joshua tree's range in California (Stoffle et al. 1990). Similarly, Tribes in Los Angeles and in the southeastern desert region identified Joshua tree woodlands in southern California as culturally important, where Joshua trees were used for basketry material, culinary purposes, and artistic applications, such as dye for baskets, ceremonial purposes, and tattoo ink (Fortier 2008, 26).

### 3.2.1 Culinary and Medicinal Uses

Yucca species have been and continue to be an important food source since the earliest traditional cultures of the Southwest. Fruits of Mojave yucca, Joshua tree, and chaparral yucca were gathered for food among the Tribes of southern California, northwestern Arizona, and southern Nevada, (Bell and Castetter 1941, 22 and 63). Although the fruit of Mojave yucca (reported with the older name *Yucca mohavensis* by Bell and Castetter [1941]) could be eaten dry, most people preferred it cooked after drying and made into a drink (Bell and Castetter 1941, 18). Particularly important to the Chemehuevi, Cahuilla, and Serrano culturally affiliated Tribes' diets, "various species of yucca fruits, mescal, and seeds were collected by the women of the Tribe" (Stickel et al. 1980, 98; Braun and Gates 2013, 63 and 71). Basket lids were sealed with greasewood (*Adenostoma fasciculata*) gum for storage of seeds, which allowed them to be kept indefinitely (Braun and Gates 2013, 63). Food stores were frequently cached in caves or rock crevices; these "caches were important for the Chemehuevi when they maintained a more nomadic existence because they allowed the Chemehuevi the freedom to venture to other areas without having to be concerned with their food supply when they returned" (Braun and Gates 2013, 63). Processed edible parts of Joshua tree would be kept for long periods in storage areas (FTBML, pers. comm., 2024).



Many parts of yucca and agave plants are used for culinary purposes, such as the yucca plant's flower buds, fruits, roots, bulbs, seeds, and stems (Bean and Saubel 1972; Eckhardt and Hatley 1982; Stoffel et al. 2022). The plants are a year-round staple, producing several types of traditional foods for Native Americans of the Mojave Desert, Great Basin, and Colorado Plateau (Stoffel et al. 2022, 23). Collecting parts of the yucca plant is purposefully timed to obtain nutritional value and optimize the quality of yucca material while contributing to the long-term productivity of the plant (Anderson 2005, 265). For example, Anderson reports that "the young flower stalks of [chaparral yucca]... and basal portions of the plants, with leaves removed," were harvested in late spring and "eaten after being roasted in a pit oven with hot stones" (Anderson 2005, 268).

California Native American tribes have noted that the preparation of Joshua tree to be consumed is a major social event (Stoffel et al. 2022, 24). The Fernandeño Tataviam Band of Mission Indians shared that yucca provided the most reliable and plentiful source of energy available to their ancestors; the root and stalk would be cooked slowly prior to being consumed (FTBMI, pers. comm., 2024). The seeds contributed important nutritional value, being especially high in fiber, oil, and sugar (Webber 1953). Seeds were finely ground and either eaten raw or cooked in the form of mush by Tribes in Southern California (Palmer 1878, 647). Immature seed pods were also used as food in early spring and were boiled down or cooked in roasting pits (Louderback et al. 2013). The seed pods of yucca and agave species have been observed in roasting pits dating back at least 4,000 years throughout the Southwest (Price et al. 2009, 18; Louderback et al. 2013, 285). Many sources state that gathering the flowers of Joshua tree and blossoms of other yucca species occurs in early spring (Bean and Saubel 1972; Stickel et al. 1980, 89; Eckhardt and Hatley 1982, 37; Tübatulabals, pers. comm., 2024). Joshua tree flowers and blossoms are eaten fresh or pickled (Tübatulabals, pers. comm., 2024). Flower buds that are cooked are similar in flavor to artichokes (Anderson 2005, 245). Fortier (2008) wrote that sugar from the flowers of Joshua tree has been used as an addition to the ground seeds of four-wing saltbush (*Atriplex canescens*) to create a pinole (roasted corn or maize) drink. In addition, yucca moth larvae, which develop within the fruits of yucca plants, are considered to be a special culinary treat (Stoffel et al. 2022, 23).

Published literature provides limited insight into the medicinal properties and uses of yucca species; however, medicinal TEK is an area of cultural tradition that is strongly associated with oral storytelling and generational knowledge transfer through hands-on education from elders to youth. Information regarding the uses of yucca species for healing purposes will be incorporated into the Conservation Plan in the future, to the extent available. Secondary sources noted that the root of the Joshua tree, "especially the red part," has a medicinal effect similar to greasewood as an antiviral and anti-inflammatory (Stickel et al. 1980, 223). Garcia and Adams Jr. (2009) note that chaparral yucca was used as a medication for skin irritations among the Kumeyaay Tribe.





### 3.2.2 Material Uses

Material uses of Joshua tree and other yucca species have been and continue to be essential for many functions of the California Native American tribes that inhabit and trade within or near Joshua tree habitat. Yucca species have been documented as being used for pole binding, cordage for building structures, carrying straps, and soap (Barrows 1900, 36–37, 47; Braun and Gates 2013, 135), with the leaves in particular being used for binding and cordage (Hedges 1967, 47–48; Wilken 2012, 136), and dried trunks being used



*Dried Joshua tree leaves with woven baskets in background.  
Source: Native American Land Conservancy.*

to make sandals (Wilken 2012, 136–137). Yucca cord is often two-strand and twisted in a right spiral, with the fur strips being twisted about the cord base in a left-to-right spiral (Bell and Castetter 1941, 43). Seasonal variation in environmental conditions influence what parts of the Joshua tree might be better suited for gathering according to the type of textiles created from the plant (Anderson 2005, 130). Native Americans of the Mojave Desert pounded leaves of Joshua trees and other yucca and agave plants to expose fibers, which after drying were made into cordage (Stoffle et al. 2022, 23). The spines were used as needles for sewing, tattooing, and separating fibers when making baskets, and as awls when a handle was added (Stoffle et al. 2022, 23). Joshua tree fibers form a natural, elastic textile (Bean and Saubel 1972) used for rope, basket making, sandals, hairbrushes, paint brushes, bowstrings, and netting (Churchill et al. 1879; Barrows 1900, 47; Bean and Saubel 1972). Younger Joshua trees have more elastic fibers than older trees and were preferred for some material construction (Diguet and Poisson 1896).

The roots of Joshua tree are harvested for dyes and basket weaving purposes (FYQIT, pers. comm., 2024; Tübatulabals, pers. comm., 2024). The long roots were frequently used by Southern California desert Tribes, including the Kawaiisu, Kitanemuk, Owens Valley Paiute, Tübatulabals of Kern Valley, and Timbisha Shoshone (formerly known as the Panamint Shoshone) for making coiled baskets and utensils (Coville 1892, 358; Voegelin 1938, 30; Bell and Castetter 1941, 35; Zigmund 1978, 201; McDaniel et al. 2012, xvi, 2-8 through 2-9; Anderson 2018 ). The Joshua tree roots were removed selectively and collected in batches to allow rest periods for the plants and to not deplete the Joshua trees in a localized area (Anderson 2005, 191). The Tübatulabals of Kern Valley advise that roots should not be dug up in sections longer than 18 inches (Tübatulabals, pers. comm., 2024). The red color of the root of Joshua trees is what makes them desirable for basket weaving and creating patterns, such as lightning bolts for the Kitanemuk



basket makers (Anderson 2005, 43). The roots have been documented to create black, brown, light yellow, and red dyes, depending on the season they are harvested (Steward 1933, 271; Voegelin 1938, 30; Murphey 1959). The Paiute preferred roots of yucca from plants above 4,000 feet in elevation because the roots had better color than those from lower elevations (Anderson 2005, 53). Among the Kawaiisu and Tübatulabal, the roots were used in making coiled baskets and basket caps, and the fibers were used for making sandals (Voegelin 1938, 30; Zigmond 1978, 201; McDaniel et al. 2012, xvi, 2-8 through 2-9). Parts of the Joshua tree could also be used to make grass skirts and shoes (FYQIT, pers. comm., 2024). The Kawaiisu additionally used Joshua tree when making twined and burden baskets (Zigmond 1981, 201).



*Woven baskets with intricate patterns are made with Joshua tree leaves and roots. A bundle of roots on the right side is the source of the dark colors to make the patterns in the baskets.*  
Source: Native American Land Conservancy.

### 3.3 TRADITIONAL ECOLOGICAL KNOWLEDGE FOR CONSERVATION

Reestablishing and healing severed relationships with the earth through activities, such as gathering, crafting, and using products from nature, are important cornerstones to continue to keep California Native American relations with nature alive, rich, and sustainable (Anderson 2005, 338). TEK is a direct connection between Native Americans and the environment that is important for conservation of nature. Spiritual connections and belief systems guide Native American landscape management throughout California, and consultation now affords the ability for Tribes to articulate aspects of TEK that include spiritual elements that may be new to private landowners, local, state, and federal agencies (FIICPI, pers. comm., 2024). As such, it is critical that landowners and agencies take time to consider these new aspects of environmental protection and incorporate them into their plans, policies, and guidance (FIICPI, pers. comm., 2024). Native Americans continue to have highly participatory relationships with nature, which may be intertwined within their Creation Story. Payahuunadü, the Land of Flowing Water, is considered a living church and the Chuk-ke-shuv-ve-wě-tah's (Oak Creek or Fort Independence Indian Reservation's) Creation Story includes ancestral lands, and their caring for, that extend beyond the artificial boundaries of their reservation (FIICPI, pers. comm., 2024). Practicing TEK, which is an ongoing cumulative body of knowledge, practices, and beliefs passed on through generations by Native Americans, is one way to heal these severed relationships with the earth and to achieve the Conservation Plan's vision for western Joshua tree.



As described in published literature and current tribal input, Joshua tree remains highly valued for its cultural significance. Landscape-level management was the driving force behind the continued livelihood of most Native Americans in Southwestern California, including in the Mojave Desert and Joshua tree woodland habitat (Anderson 2005, 160–165; Stoffel et al. 2022, 23). Tribes hold landscape-level management that extends beyond the boundaries of reservations and holistic views of culture and biology as key to managing a species (Stoffel et al. 2022; FIIICPI, pers. comm., 2024; KVIC, pers. comm., 2024). The Tübatulabals of Kern Valley have highlighted the importance of protecting other native species in Joshua tree’s range in California to properly care for the ecosystem (Tübatulabals, pers. comm., 2024). Fort Independence Indian Community of Paiute Indians stress the importance of engaging with all Tribes that have Joshua trees as part of their traditional cultural landscape to better understand how to manage and treat the trees in their cultural ways (FIIICPI, pers. comm., 2024). Tribes are working with CDFW to identify actions that benefit multiple ecologically related species. For example, yucca moth and yucca have a mutualistic, ecological relationship and are dependent on each other for reproduction and long-term survival (see Section 4.2, “Wildlife Values and Ecological Function of Western Joshua Trees,” for more details).

Native American landscape-level management bolsters plant and wildlife populations through actions that encourage the growth of culturally important plant species, which includes Joshua tree and yucca species (Zigmond 1981; Anderson 2005, 191 and 338). Harvesting the tender, immature flower stalks of yucca species before flowering may have stimulated vegetative reproduction through a hormonal change in the plants, forcing them to produce “pups”—small plants attached to the parent plant, which would create additional plants in a desirable area (Anderson 2005, 130 and 269). Pruning and cutting plants are strategically done to enhance plant growth as well (Anderson 2005, 2018). Native Americans have known and understand that among desert plants, propagation is dependent on microhabitats and nurse plants to shelter seedlings, which affect the generation and distribution of Joshua tree plant communities (Brittingham and Walker 2000; Tübatulabals, pers. comm., 2024).



*Tribal members help dig a hole for a demonstration of a western Joshua tree transplanting.*

*Source: Native American Land Conservancy.*





There are limited areas of Joshua tree woodlands, and tribal representatives have remarked on the importance of these areas for ethnobotanical resources (Stoffle et al. 2022, 24). Joshua trees provide key habitat for other wildlife and plant species important to California Native American tribes (Stoffle et al. 2022, 23). In a series of interviews with consulting tribal representatives, one representative noted that wildlife live in the Joshua tree woodland; therefore, any disturbance could lead to the destruction of the habitat, and thus, many wildlife would die or leave the valley (Stoffle et al. 2022, 24).

Native Americans have skillfully gathered plants over long periods in different habitats without depleting plant populations to the point of extinction (Anderson et al. 1997, 33). The Fort Independence Indian Community of Paiute Indians indicate they wouldn't take western Joshua tree unless it was critical and beneficial for our people overall (FIICPI, pers. comm., 2024). A representative from the Tribe further explained that living in excess is a threat to the land and specifically the western Joshua tree species and does not align with the Tribe's values to take only what is needed from the land (FIICPI, pers. comm., 2024). According to *Tending the Wild* author, M. Kat Anderson, "Removing key elements from nature means the possibility of ecological degradation. . . . Removing elements from natural systems with thoughtfulness and respect, one [begins to] address the complex interplay between resource production and the conservation of biological diversity. Judiciously harvesting, crafting, and using products from nature continue to be the three cornerstones that keep Indian relationships with nature alive, rich, and sustainable." (Anderson 2005, 338).



Source: Native American Land Conservancy.



Regular Native American application of low-intensity, periodic fire across landscapes in California to manage vegetative communities and stimulate desirable plant growth is well-documented (Blackburn and Anderson 1993; Keeley 2002; Stewart 2002; Vale 2002; Anderson 2018; Roos et al. 2021; Schelenz 2022). The Kern Valley Indian Community and the Agua Caliente Tribe of Cupeño Indians addressed the topic of burning for management of Joshua trees. Both Tribes noted that there was not a tradition of cultural burning for the management of Joshua trees or the Joshua tree woodland community because there had traditionally not been a reason to burn it (ACTCI, pers. comm., 2024; KVIC, pers. comm., 2024). However, both noted that the environment has changed and believe that burning to reduce fuel loads containing invasive species, and therefore reducing fire intensity, is presently needed. The Kern Valley Indian Community has firsthand experience with Joshua trees and wildland fire and note that in their community, where a fire burned in 2016, Joshua trees were killed and no regrowth from the crowns was observed in areas on the flats where the fire burned more intensely. However, the Kern Valley Indian Community observed Joshua trees have been regrowing from the roots on slopes where the fire did not burn as intensely (KVIC, pers. comm., 2024). The Agua Caliente Tribe of Cupeño Indians' Tribal Chair indicated there may be potential for Joshua tree germination in an environment with fire ash and biochar (ACTCI, pers. comm., 2024).

Although California Native American tribes have noted that cultural burning is used less often in the desert than in other plant communities, there are still documented uses of periodic fire being employed by Native Americans in Southern California. For example, among the Kumeyaay of Southern California, yucca and agave seeds were planted immediately before burning a slope, and germination was induced by the heat of fire (Stoffle et al. 2022, 23). These stimulated plants did not provide immediate materials and would take several years to mature to usable size, providing evidence of long-range plant husbandry planning by the Tribes (Stoffle et al. 2022, 23).

Many southwestern plant species are transplanted across the desert by Native Americans to areas of importance to increase the availability for traditional purposes (Anderson 2005, 143 and 160–165; Stoffle et al. 2022, 23). The density observed in Joshua tree woodlands suggests that Joshua trees were stimulated to grow in the desert, especially near culturally important sites (Stoffle et al. 1989, 98; Stoffle et al. 2022, 23). There are documented accounts of Native Americans saving the seeds of agave, yucca, and desert fan palms and planting them in specific locations within the Mojave Desert, demonstrating the integral nature of plant cultivation in Native American cultural systems (Stoffle et al. 1989, 129 and 138; Anderson 2005, 161; Stoffle et al. 2022, 23).







*Western Joshua tree being watered after it has been transplanted by tribal members.*

*Source: Native American Land Conservancy.*

Native Americans skillfully gather plants over long periods in different habitats to manage the health of ecosystems while alternatively ensuring key cultural use species are readily available. This requires knowledge of each species' life characteristics (Anderson et al. 1997, 33). Joshua tree is abundantly present and has a wide habitat range in the desert Southwest because of this skillful knowledge and practice. The sustainability of Native American practices allows natural vegetation and human inhabitation of the landscape to coexist. Integration of California Native American tribes' traditional

cultural uses and TEK for landscape-level health is crucial for land management strategies pertaining to conservation of western Joshua tree.



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## 4 SUMMARY OF RESOURCE CONDITIONS

The starting point for assessing western Joshua tree conservation needs and developing management actions is understanding the existing range and distribution, habitat requirements, ecology, population trends, and key stressors and threats to the species. Detailed information on resource conditions related to western Joshua tree is available in CDFW's March 2022 status review of western Joshua tree (CDFW 2022). This chapter summarizes the resource conditions of western Joshua tree from the status review and additional information and analysis not available when the status review was finalized. Information from a summary of western Joshua tree resource conditions prepared by USFWS (2023) is also included.

### 4.1 WESTERN JOSHUA TREE BIOLOGY AND ECOLOGY

#### 4.1.1 Range and Distribution

The western Joshua tree range and distribution in California are described in this section in reference to the ecoregions where they occur. Ecoregions are delineated based on biotic factors (i.e., living parts of an ecosystem) and environmental factors that determine the structure and function of ecosystems. Environmental factors include climate, physiography, water, soils, air, hydrology, and natural communities (ECOMAP 1993).

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*"It's the Joshua tree's struggle  
that gives it its beauty."  
— Jeannette Walls,  
The Glass Castle*

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Western Joshua tree is present in discontinuous populations, mainly within the western Mojave Desert and extending north and east into the southwestern Great Basin across various ecoregions. The southern portion of the range extends south into the Southern California Mountains and Valleys ecoregion (Figure 4-1). The western portion of the range extends into the Sierra Nevada ecoregion and into a limited portion of the Sierra Nevada Foothills



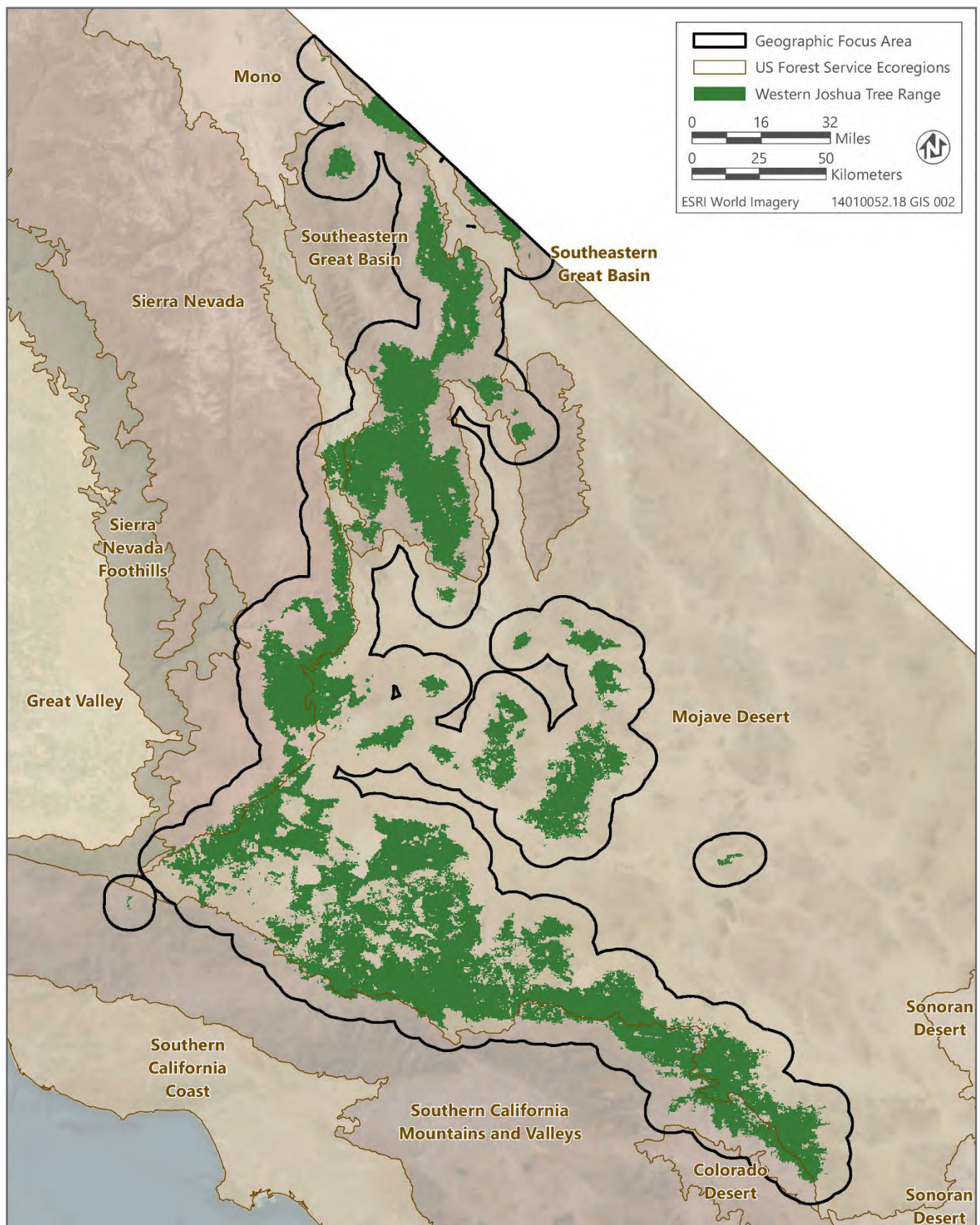
ecoregion. Western Joshua tree is often noted to be abundant in ecological and sometimes elevational transition zones along the border of the Mojave Desert ecoregion. The southern extent of the species is east of Indio Hills, California, near Rockhouse Canyon and north of Fargo Canyon, and the western extent is an isolated population in Los Angeles County at the junction of Orwin Way Road and Quail Canyon Motocross Road near Caswell (Esque et al. 2023). The northern and eastern extents of the range are located just south of Tonopah, Nevada (Esque et al. 2023), and Tikaboo Valley, Nevada (Rowlands 1978; Smith et al. 2021), respectively, which are not represented in Figure 4-1 because only the California portion of the range is shown. The northern extent of the species in California is likely in the southeastern corner of Mono County, between Wildhorse Creek and Furnace Creek, which are north of Deep Springs, California, and south of Dyer, Nevada (Esque et al. 2023).

The Conservation Plan addresses the known portion of the western Joshua tree range in California within Riverside, San Bernardino, Los Angeles, Kern, Inyo, and Mono counties, and the small portions of the geographic focus area in Tulare and Ventura counties (Figure 4-1). Substantial stands of western Joshua tree have been reported at elevations ranging from approximately 750 to 2,100 meters (2,460 to 6,890 feet) above sea level (Rowlands 1978). The data used for the mapping developed by Esque et al. (2023) (Figure 4-1) show western Joshua tree present at approximately 585 meters (1,919 feet) up to approximately 2,675 meters (8,776 feet). The range of western Joshua tree in California has been estimated to encompass a total area of approximately 13,088 square kilometers (5,053 square miles) across six ecoregions (Table 4-1) (Esque et al. 2023).

Western Joshua tree has a sprawling, diffuse pattern of distribution, particularly compared to eastern Joshua tree (*Yucca jaegeriana*) (Figure 1-1 in Chapter 1, "Introduction") (Esque et al. 2023). High densities of western Joshua tree are present along the southern end of the species' range, separated by large gaps where the species is absent, particularly in the southwestern portion of the range. These conspicuous gaps in the species' distribution are likely a result of urban development, fire, and other cumulative disturbances (Esque et al. 2023). In California, most of the western Joshua tree range is within the Mojave Desert ecoregion and the Southeastern Great Basin ecoregion (Table 4-1; Figure 4-1). Most high elevation portions of the western Joshua tree range in California are in the Southeastern Great Basin ecoregion. Some high elevation portions of the species range in California are also in the Sierra Nevada and Southern California Mountains and Valleys ecoregions.







Sources: Esque et al. 2023; USFS 2024; adapted by Ascent in 2024.

**Figure 4-1 California Ecoregions and Range of Western Joshua Tree in California**





**Table 4-1 Western Joshua Tree Range in California by Ecoregion and Elevation**

| Ecoregion                                              | Elevation Class <sup>1</sup> | Area in Square Kilometers (sq mi) | Percent of Range |
|--------------------------------------------------------|------------------------------|-----------------------------------|------------------|
| Mojave Desert                                          | low elevation                | 6,024.3 (2,326.0)                 | 46.0             |
|                                                        | middle-low elevation         | 1,809.2 (698.5)                   | 13.8             |
|                                                        | middle-high elevation        | 1.8 (0.7)                         | <0.1             |
| <b>Mojave Desert total</b>                             |                              | <b>7,835.2 (3,025.2)</b>          | <b>59.9</b>      |
| Southeastern Great Basin                               | low elevation                | 10.4 (4.0)                        | 0.1              |
|                                                        | middle-low elevation         | 1,265.8 (488.7)                   | 9.7              |
|                                                        | middle-high elevation        | 1,712.5 (661.2)                   | 13.1             |
|                                                        | high elevation               | 209.6 (80.9)                      | 1.6              |
| <b>Southeastern Great Basin total</b>                  |                              | <b>3,198.4 (1,234.9)</b>          | <b>24.4</b>      |
| Sierra Nevada                                          | low elevation                | 164.1 (63.4)                      | 1.3              |
|                                                        | middle-low elevation         | 826.1 (319.0)                     | 6.3              |
|                                                        | middle-high elevation        | 153.4 (59.2)                      | 1.2              |
|                                                        | high elevation               | 0.3 (0.1)                         | <0.1             |
| <b>Sierra Nevada total</b>                             |                              | <b>1,143.9 (441.7)</b>            | <b>8.7</b>       |
| Southern California Mountains and Valleys              | low elevation                | 85.3 (32.9)                       | 0.7              |
|                                                        | middle-low elevation         | 581.0 (224.3)                     | 4.4              |
|                                                        | middle-high elevation        | 232.1 (89.6)                      | 1.8              |
|                                                        | high elevation               | 7.3 (2.8)                         | 0.1              |
| <b>Southern California Mountains and Valleys total</b> |                              | <b>905.8 (349.7)</b>              | <b>6.9</b>       |
| Mono                                                   | middle-high elevation        | 2.8 (1.1)                         | <0.1             |
| <b>Mono total</b>                                      |                              | <b>2.8 (1.1)</b>                  | <b>&lt;0.1</b>   |
| Sierra Nevada Foothills                                | middle-low elevation         | 0.7 (0.3)                         | <0.1             |
| <b>Sierra Nevada Foothills total</b>                   |                              | <b>0.7 (0.3)</b>                  | <b>&lt;0.1</b>   |
| <b>Total</b>                                           |                              | <b>13,086.8</b>                   | <b>100.0</b>     |

Notes: m = meters; sq mi = square miles.

<sup>1</sup> The elevational range of western Joshua tree was divided into four equal range classes: low elevation: 585–1,105.9 meters (1,919–3,628 feet); middle-low elevation: 1,106–1,625.9 meters (3,629–5,334 feet); middle-high elevation: 1,626–2,145.9 meters (5,335–7,040 feet); high elevation: 2,146–2,675.9 meters (7,041–8,780 feet).

Source: Esque et al. 2023; USFS 2024; compiled by Ascent in 2024.

## GENETIC VARIATION

Genetic variation within a species can allow it to adapt to environmental change. Adaptive genetic variation directly affects a species' ability to respond to environmental factors, such as heat stress and drought, highlighting the importance of conserving adaptive genetic



variation within species ecotypes (i.e., subgroups of a species that are genetically distinct), compared to conserving overall genetic variation within the species (Smith et al. 2023). A substantial amount of scientific attention has been directed toward understanding the coevolution of western Joshua tree, eastern Joshua tree, and their obligate pollinating moths. Much of this attention is focused on a small area in Tikaboo Valley, Nevada, where the two species of Joshua tree co-occur and hybridization has been observed. Western Joshua tree and eastern Joshua tree have a moderate degree of genetic differentiation and diverged approximately 100,000 to 200,000 years ago, which is considered a relatively recent divergence (Smith et al. 2021). The work by Smith et al. (2021) supports the conclusion that Joshua trees fall into two distinct groups that correspond with western Joshua tree and eastern Joshua tree. Smith et al. (2021) indicate there is genetic diversity among populations of western Joshua tree, particularly among populations in the southern and western extent of its range, possibly driven by adaptations to different climates. The study identified three genetically distinct groups of western Joshua tree across five populations that were sampled within the range in California, which are all located in the Mojave Desert ecoregion, although two populations that are in genetically distinct groups are less than 2 miles from the Southern California Mountains and Valleys ecoregion. Smith et al. (2023) suggested these genetically distinct populations may respond differently to climate change, in which case, identifying and protecting populations that are better adapted to future climate conditions could potentially improve conservation of the species. Further genetic analysis of western Joshua tree is currently in review and will be incorporated into the Conservation Plan in a future update.

### 4.1.2 Habitat Requirements

Western Joshua trees live in a variety of environments in a wide range of elevations, landforms, soil types, and vegetation communities. Research conducted by Esque et al. (2023), which addressed the entire range of western Joshua tree, showed that climatic variables are typically more accurate predictors of western Joshua tree presence than topography and vegetation; however, topography and vegetation may still be important factors for western Joshua tree survival.

#### CLIMATE

Western Joshua trees rely on precipitation events to augment soil moisture as a water source. Unlike mature Joshua trees, juvenile Joshua trees and seedlings do not have access to deep groundwater and are unable to store much water in their tissues. Duration of droughts and high precipitation periods are likely important factors in determining where western Joshua tree can successfully reproduce and survive. Where western Joshua trees are found, precipitation is received as rain and less frequently as snow, with most precipitation occurring between



October and April (Hereford et al. 2004). Annual precipitation for western Joshua tree is largely restricted to the winter months because of the species' western position in the Mojave precipitation gradient (Esque et al. 2023). Precipitation across the Mojave Desert region is highly variable from year to year and oscillates between wetter and drier conditions within multiyear and multidecade timescales. The soil moisture requirements of western Joshua tree likely vary depending on factors including life history stage, soil texture, ambient temperatures, local topography, elevation, and the presence and cover of other plants.



Source: Jeb Bjerke, California Department of Fish and Wildlife.

Species distribution modeling efforts by Esque et al. (2023) have revealed the environmental factors with the greatest influence on predicting western Joshua tree presence: mean annual temperature (defined as the average of the monthly temperature averages for the climatic normal period 1980–2010), temperature seasonality (standard deviation [i.e., measure of variation in data] of the monthly mean temperatures), precipitation seasonality (variation in monthly precipitation totals for the normal period 1980–2010), and summer precipitation (average total precipitation received from May through October, based on the climatic normal period 1980–2010). Other predictive factors for western Joshua tree presence, in order of importance, are annual heat/moisture index (mean annual temperature divided by mean annual precipitation), winter minimum temperature (average minimum temperature from December through February based on the climatic normal period 1980–2010), precipitation



ratio (ratio of summer to winter precipitation), and mean annual precipitation (average annual precipitation during the climatic normal period 1980–2010).

### TOPOGRAPHY AND SOILS

Western Joshua trees are found on a variety of landforms in the Mojave Desert and Great Basin ecoregions, including gentle alluvial fans, bajadas, flats, ridges, mesas, and gentle to moderate slopes, often near the bases of mountains (Huning and Petersen 1973; Thomas et al. 2004; Gucker 2006), although at higher elevations, the species can also be found on steep slopes at lower densities (Esque, pers. comm., 2022, cited in USFWS 2023). The greatest densities of Joshua trees may be found on well-drained sandy to gravelly alluvial fans. Where western Joshua tree is less common, it is likely restricted to areas with sufficient groundwater, such as large sand dunes or groundwater drainages (Charlton and Rundel 2017).

Because water availability limits western Joshua tree survival and reproduction, the soil's water-retention capacity is likely important for the species. Western Joshua trees have been reportedly found more frequently on soils with bimodal textures (i.e., various sized soil particles) with both coarse sands and fine silts that facilitate soil moisture retention (Huning and Petersen 1973; Sawyer et al. 2009). Soil moisture is an important factor for western Joshua tree soil habitat. When not present in sufficient quantities, it can be a limiting factor to western Joshua tree distribution. Joshua tree habitat generally contains old alluvial rocks of igneous rather than sedimentary origin and soils that are coarse sands, very fine silts, gravel, or sandy loams (Rowlands 1978; Sawyer et al. 2009). Western Joshua tree appears unable to grow well in places with insufficient soil moisture available, such as in areas where soils have a high clay content or high volumes of coarse particles (Huning and Petersen 1973; Borchert 2022), or where the depth to bedrock is less than 1 meter (3.3 feet) (Huning and Petersen 1973). Western Joshua tree could grow in areas that collect water due to topography, subsurface bedrock, and soil structure that may otherwise be too hot or too dry, and such areas could provide important refugia for the species in the future. Therefore, water availability in soil is an important abiotic factor (i.e., nonliving part of an ecosystem) for western Joshua tree survival.

In addition, soil biotic factors play a role in intact western Joshua tree habitat, which typically has biological soil crusts (i.e., biocrusts) (Belnap et al. 2001). Biocrusts are soil surface layers that include bacteria, cyanobacteria, algae, mosses, liverworts, fungi, or lichens and can be major components of undisturbed desert ecosystems (Belnap et al. 2001). Biocrusts add diversity to the ecological system, limit soil erosion, increase accumulation of soil organic matter and nutrients, and can either positively or negatively interact with vascular plants (Bowker 2007; Abella et al. 2023).





## VEGETATION

Western Joshua tree can occur as the characteristic species of a distinct vegetation community (i.e., a repeated pattern of plants across a landscape), or as an associate species within other tree, shrub, or herbaceous dominated vegetation communities. As described in *A Manual of California Vegetation* (Sawyer et al. 2009), which is California's standard vegetation classification system, Joshua trees are the characteristic species in the Joshua tree woodland alliance, which is defined as a stand of vegetation with greater than or equal to 1 percent cover of Joshua trees evenly distributed across the landscape, with less than 1 percent absolute cover of juniper (*Juniperus* spp.) or pine (*Pinus* spp.) trees. The understory in a Joshua tree woodland is often dominated by shrubs or grasses, and the overstory is dominated by Joshua trees and sometimes other tree species. Joshua tree can also be found in other vegetation communities where it constitutes less than 1 percent of the total overstory cover, including California juniper woodland, foothill pine woodland, and blackbrush scrub alliances.



Source: Anna Cirimele, National Park Service.





To describe the whole western Joshua tree range, a broader classification system of California Wildlife Habitat Relationships System is used in this chapter (CDFW n.d.). This classification system maps terrestrial wildlife habitat based on vegetation characteristics and can be cross-walked with the vegetation communities described in *A Manual of California Vegetation*. The habitats defined in the California Wildlife Habitat Relationships classification system that are within the range of western Joshua tree in California are desert scrub, which covers over half of the western Joshua tree range in California; Joshua tree, which is synonymous with *A Manual of California Vegetation*'s Joshua tree woodland alliance; alkali desert scrub; and sagebrush (Table 4-2). Western Joshua tree nurse plants (described in Section 4.1.3) include the dominant plants (i.e., the plants for which the species alliance is named) in creosote bush scrub alliance and blackbrush shrub alliance and the co-dominant species singleleaf pinyon pine (*Pinus monophylla*) of singleleaf pinyon-Utah juniper woodlands alliance. These vegetation alliances are classified within the California Wildlife Habitat Relationships system as desert scrub habitat, sagebrush habitat, and pinyon-juniper habitat, respectively, which are all dominant habitats within the western Joshua tree range in California (Table 4-2). Areas where Joshua tree woodland is mapped likely contain some of the densest stands of Joshua trees. Although the western Joshua tree range in California is mostly within scrub and Joshua tree habitat, western Joshua tree can occur within a variety of vegetation and natural communities; therefore, at the range-wide scale, western Joshua tree does not appear to be associated with a specific vegetation community, which aligns with findings by Esque et al. (2023) conducted at a similar scale. However, topography and vegetation may still be important factors for understanding the full habitat needs of western Joshua tree and planning for its conservation.

Vegetation within and just outside the western Joshua tree range in California has been mapped at a broad scale in Figures 4-2a through 4-2f.



**Table 4-2 Land Cover within the Western Joshua Tree Range in California**

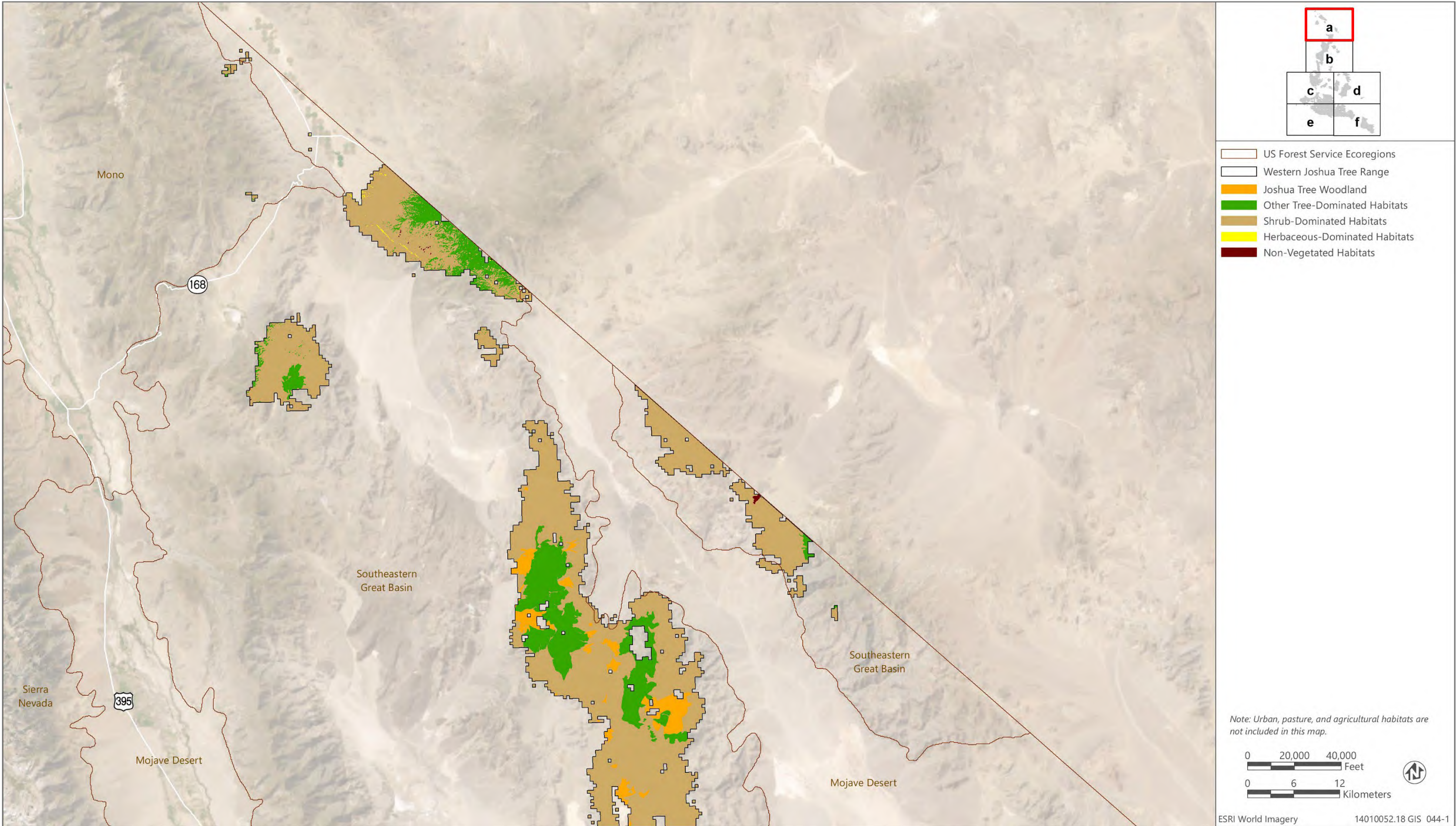
| Land Cover               | Type of Land Cover | Area in Square Kilometers (sq mi) | Percent of Range |
|--------------------------|--------------------|-----------------------------------|------------------|
| Desert scrub             | Shrub dominated    | 7,085.7 (2,735.8)                 | 54.1             |
| Joshua tree              | Tree dominated     | 1,314.5 (507.5)                   | 10.0             |
| Alkali desert scrub      | Shrub dominated    | 1,100.0 (424.7)                   | 8.4              |
| Sagebrush                | Shrub dominated    | 844.5 (326.1)                     | 6.5              |
| Pinyon-juniper           | Tree dominated     | 669.1 (258.3)                     | 5.1              |
| Juniper                  | Tree dominated     | 467.7 (180.6)                     | 3.6              |
| Mixed chaparral          | Shrub dominated    | 253.5 (97.9)                      | 1.9              |
| Annual grassland         | Herb dominated     | 245.3 (94.7)                      | 1.9              |
| Barren                   | Non-vegetated      | 111.3 (43.0)                      | 0.9              |
| Desert wash              | Shrub dominated    | 109.0 (42.1)                      | 0.8              |
| Desert succulent shrub   | Shrub dominated    | 48.7 (18.8)                       | 0.4              |
| Montane chaparral        | Shrub dominated    | 32.5 (12.5)                       | 0.2              |
| Low sage                 | Shrub dominated    | 18.9 (7.3)                        | 0.1              |
| Montane hardwood-conifer | Tree dominated     | 17.0 (6.6)                        | 0.1              |
| Bitterbrush              | Shrub dominated    | 15.6 (6.0)                        | 0.1              |
| Lake                     | Aquatic            | 11.3 (4.4)                        | 0.1              |
| Desert riparian          | Tree dominated     | 7.0 (2.7)                         | 0.1              |
| Montane riparian         | Tree dominated     | 5.2 (2.0)                         | <0.1             |
| Montane hardwood         | Tree dominated     | 3.9 (1.5)                         | <0.1             |
| Lodgepole pine           | Tree dominated     | 2.1 (0.8)                         | <0.1             |
| Riverine                 | Aquatic            | 2.1 (0.8)                         | <0.1             |
| Blue oak-foothill pine   | Tree dominated     | 1.0 (0.4)                         | <0.1             |
| Valley foothill riparian | Tree dominated     | 0.8 (0.3)                         | <0.1             |
| Fresh emergent wetland   | Aquatic            | 0.7 (0.3)                         | <0.1             |
| Saline emergent wetland  | Aquatic            | 0.7 (0.3)                         | <0.1             |

Note: Land cover types of eastside pine, wet meadow, perennial grassland, Jeffrey pine, valley oak woodland, sierran mixed conifer, blue oak woodland, coastal scrub, chamise-redshank chaparral, and ponderosa pine each represent less than 0.005 percent of the western Joshua tree range and were excluded from this table; sq mi = square miles; vegetation data is from CAL FIRE's Fire and Resource Assessment Program (FRAP), which is classified using the California Wildlife Habitat Relationships system. Converted land cover uses are presented separately in this chapter, below.

Sources: CAL FIRE 2022; Esque et al. 2023; compiled by Ascent in 2024.





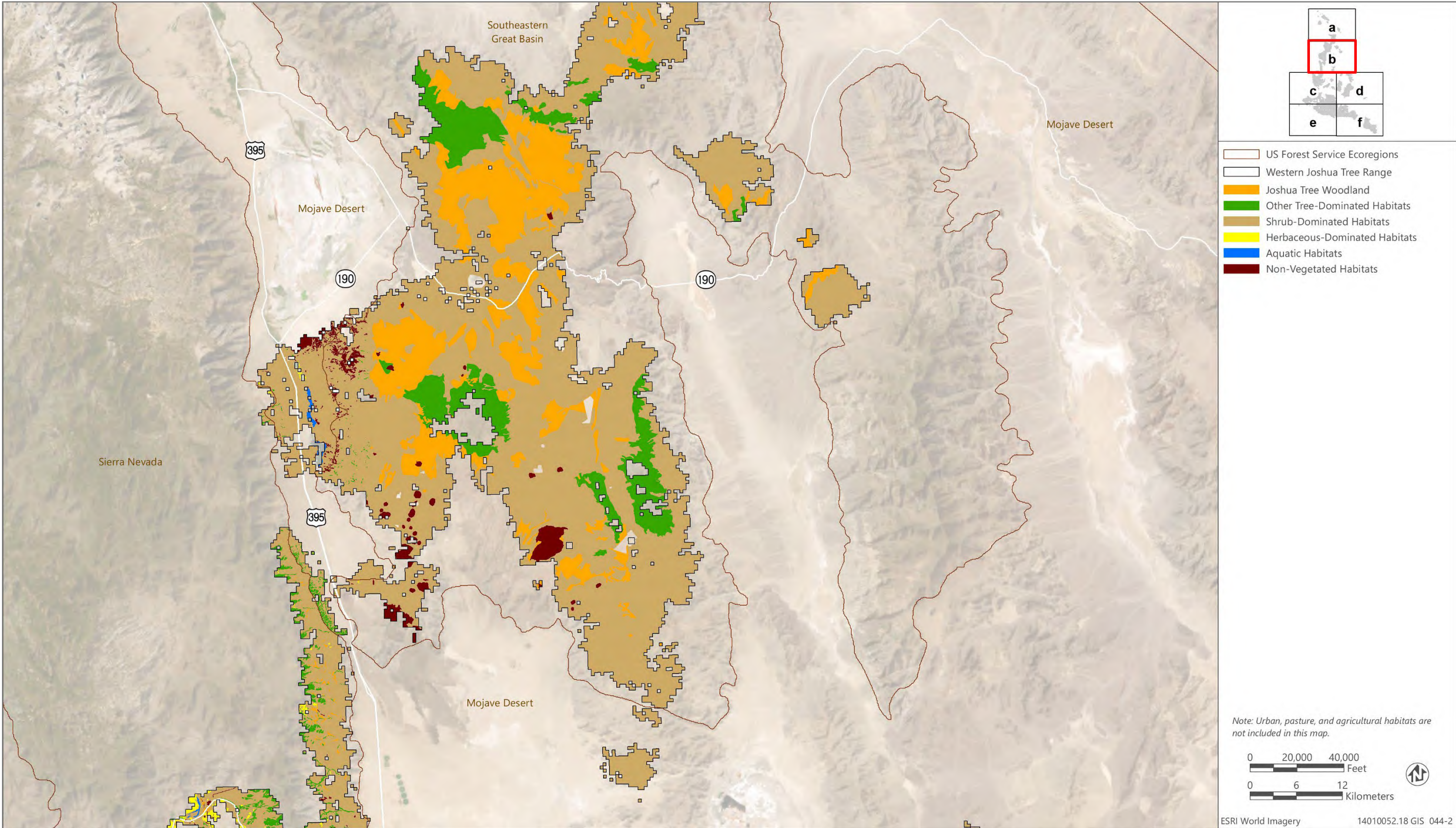


Sources: CAL FIRE 2022; Esque et al. 2023; USFS 2024; adapted by Ascent in 2024.

Figure 4-2a Land Cover within the Western Joshua Tree Range in California





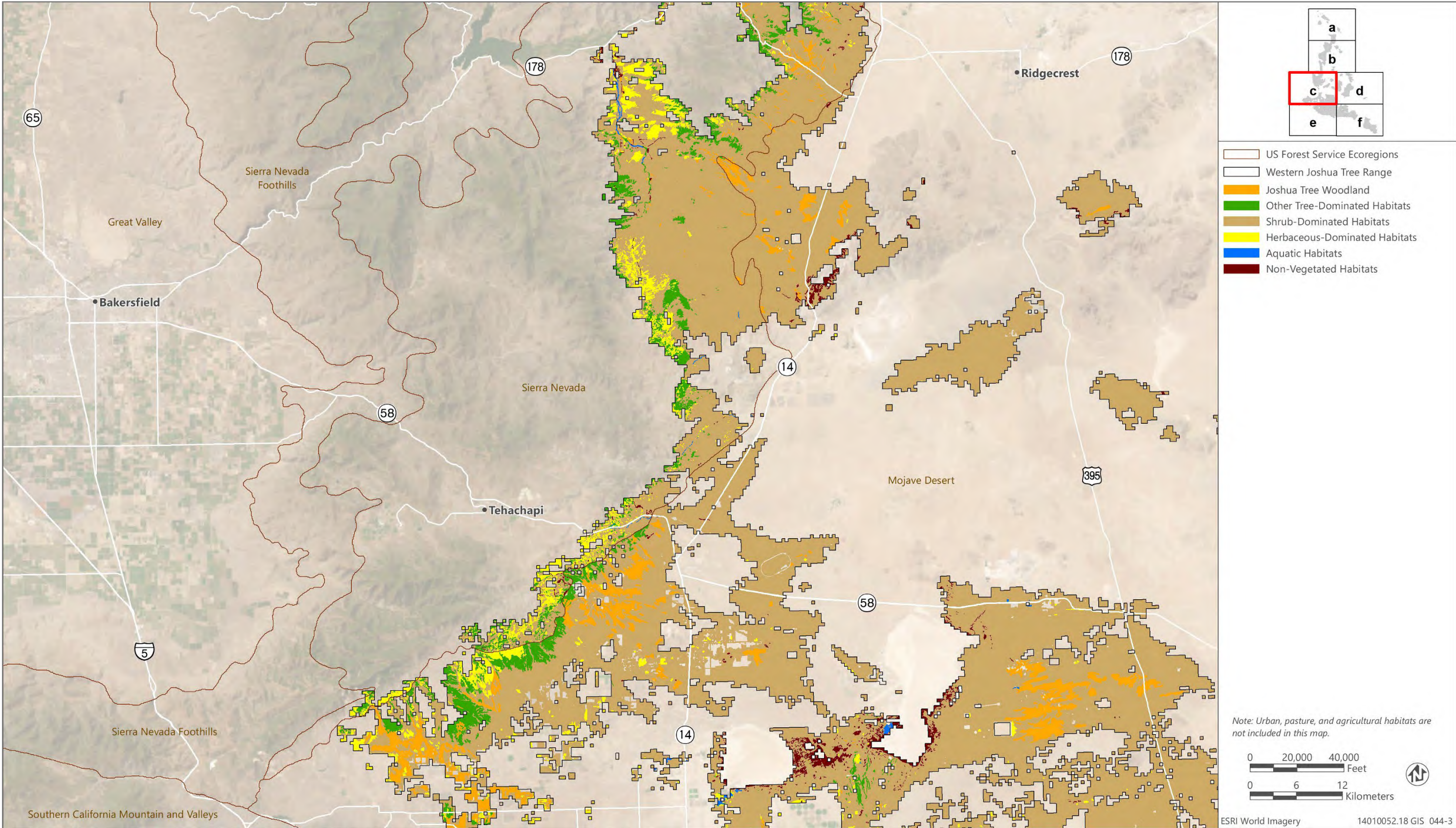


Sources: CAL FIRE 2022; Esque et al. 2023; USFS 2024; adapted by Ascent in 2024.

Figure 4-2b Land Cover within the Western Joshua Tree Range in California





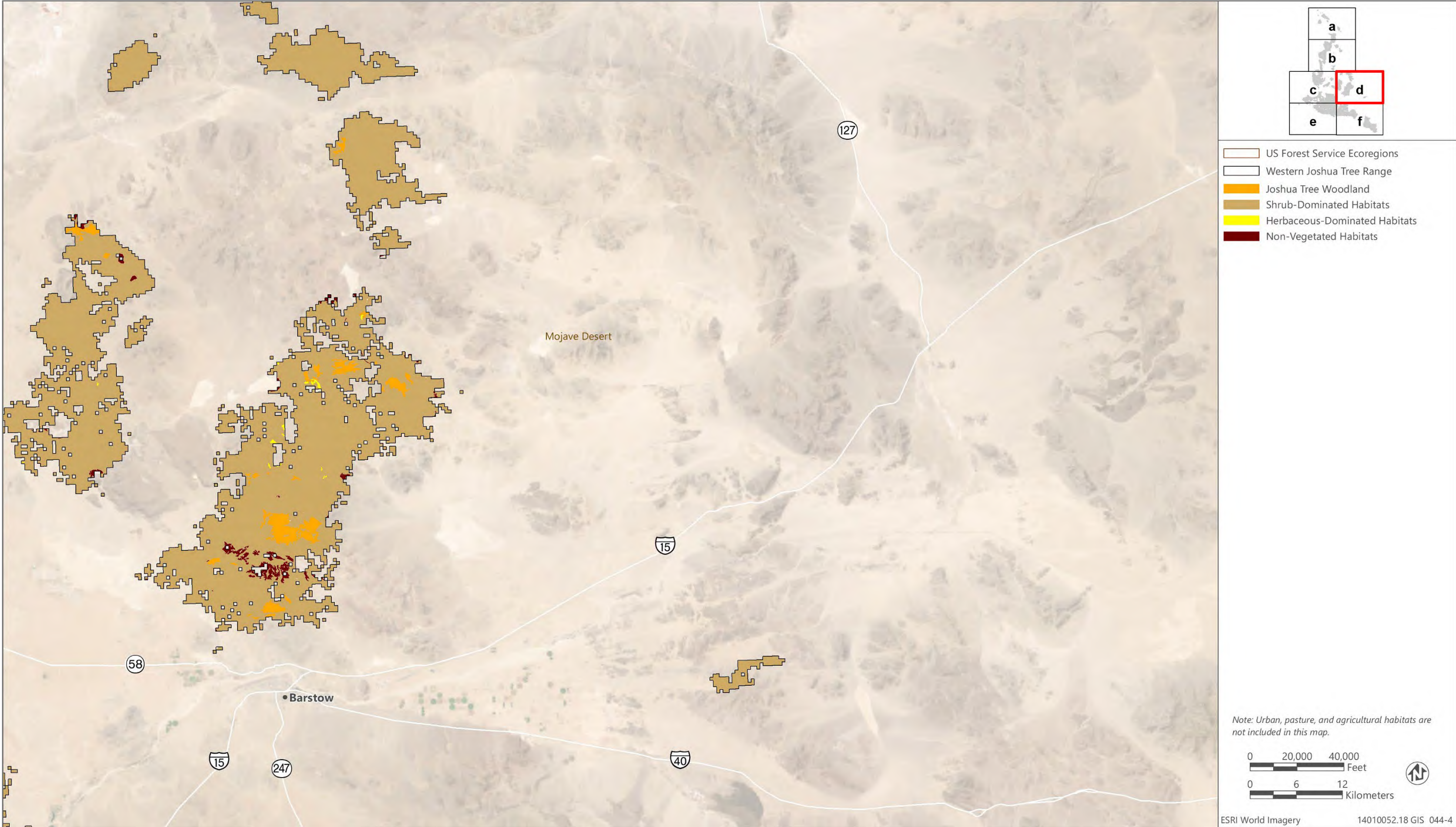


Sources: CAL FIRE 2022; Esque et al. 2023; USFS 2024; adapted by Ascent in 2024.

Figure 4-2c Land Cover within the Western Joshua Tree Range in California







Sources: CAL FIRE 2022; Esque et al. 2023; USFS 2024; adapted by Ascent in 2024.

Figure 4-2d Land Cover within the Western Joshua Tree Range in California





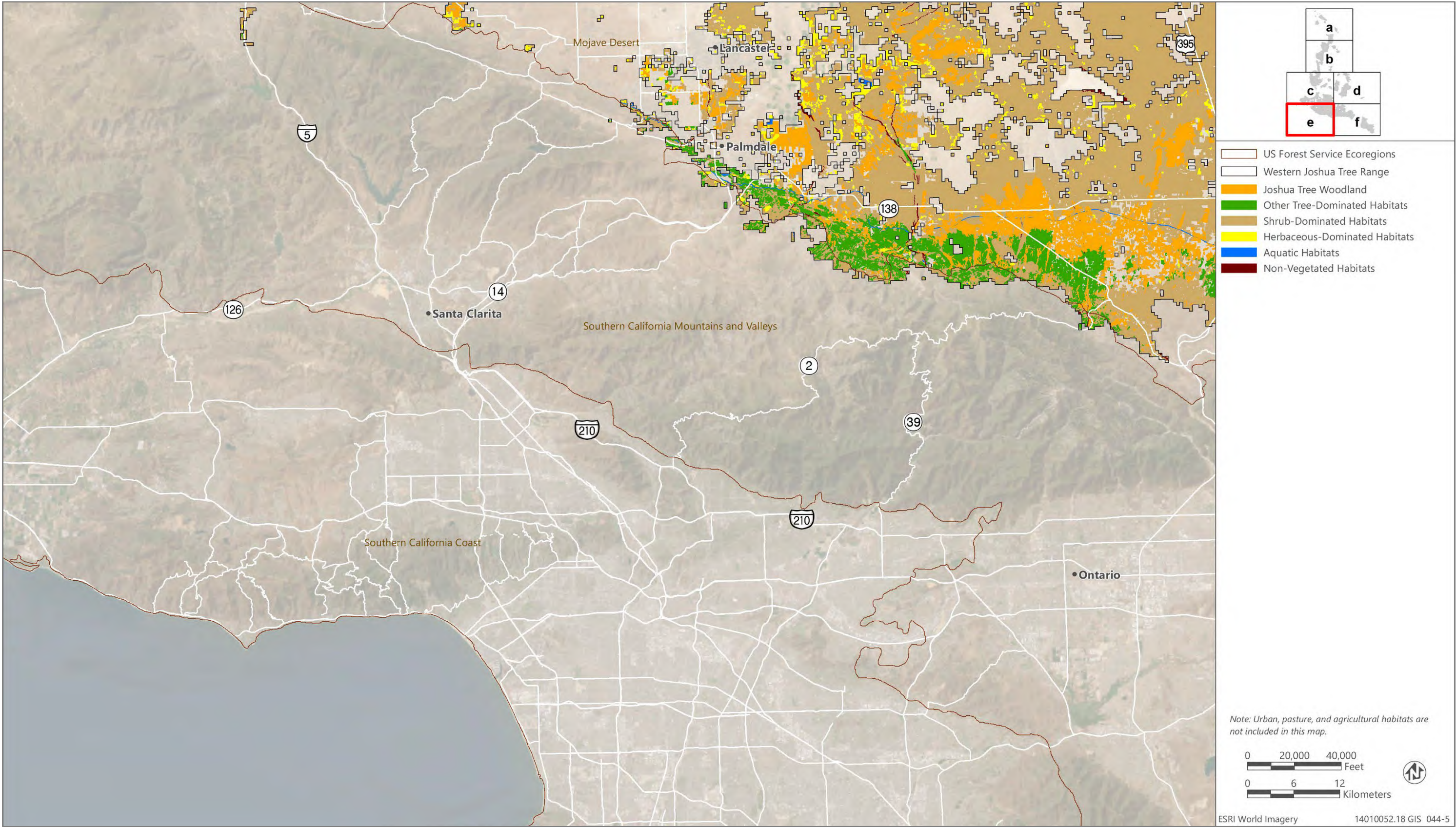
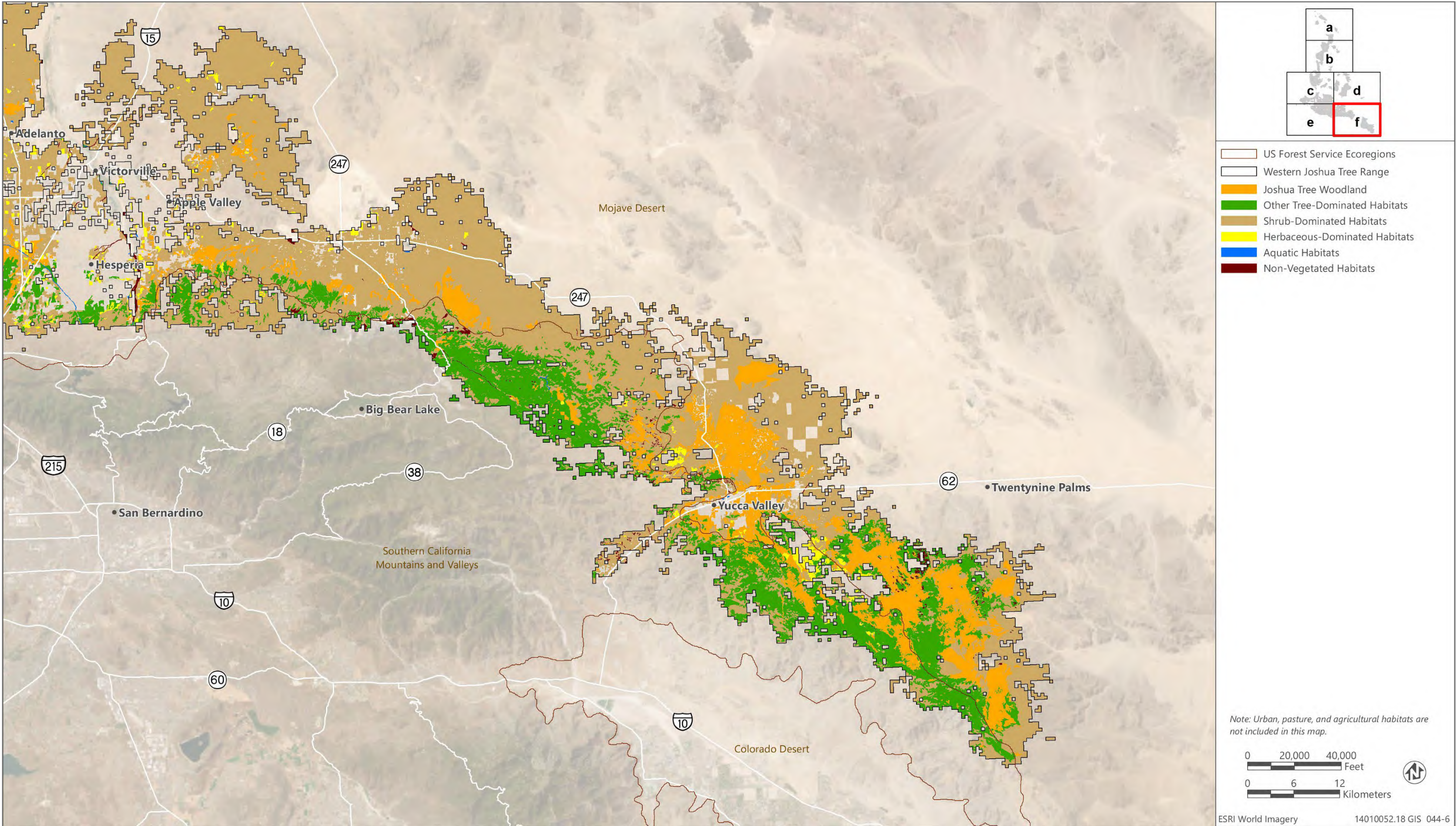


Figure 4-2e Land Cover within the Western Joshua Tree Range in California







Sources: CAL FIRE 2022; Esque et al. 2023; USFS 2024; adapted by Ascent in 2024.

Figure 4-2f Land Cover within the Western Joshua Tree Range in California





### 4.1.3 Life History

Both western and eastern Joshua tree species are relatively long-lived and slow-growing species that require a complex combination of environmental factors to successfully grow and reproduce.

#### FLOWERING

Joshua trees are mature when an individual plant begins to produce flowers, which occurs when the Joshua tree is approximately 50 to 70 years old (Esque et al. 2015) or when the plant is between 1 and 2.5 meters (3.3 and 8.2 feet) in height (Rowlands 1978). Western Joshua tree flowers between January and May, peaking in late February, but the species can flower as early as November (Barve et al. 2020; Brenskelle et al. 2021; Hess and Baldwin 2022). Flowering of western Joshua tree is thought to occur episodically rather than annually, so mature Joshua trees do not flower every year. Flowering of mature individuals at one small site in the town of Yucca Valley, California ranged from 0 to 90 percent in 15 years of monitoring (Yoder et al. 2024).



Source: Diane Etchison.

Research has increased understanding of the conditions needed for flowering (St. Clair and Hoines 2018; Barve et al. 2020; Brenskelle et al. 2021; Yoder et al. 2024). In some years, many western Joshua trees produce large quantities of fruits and seeds synchronously (Kelly and Sork 2002; Borchert and DeFalco 2016; St. Clair and Hoines 2018), which is a reproductive strategy used by western Joshua tree, called “masting” that results in a wide variation in flowering rates from year to year. Seed predators are the primary dispersal mechanism for western Joshua tree seeds. Having a mast seeding reproductive strategy is beneficial because more seeds are produced than seed predators can feasibly consume. Subsequently, surviving seeds have a higher likelihood of successfully establishing and developing into a reproductive adult (Kelly and Sork 2002). These large, synchronous flowering and masting events seem to occur as infrequently as once or twice per decade, and the conditions that produce them are not well understood (Esque et al. 2010; DeFalco and Esque 2014; Borchert and DeFalco 2016). Research conducted by Yoder et al. (2024) found that flowering in Joshua tree is more likely to occur when the growing year leading up



to flowering is wetter than the previous growing year, and that previous growing year is drier than the growing year before it (i.e., going from a year to a drier year and then to a wetter year tends to result in flowering). Yoder et al. (2024) defined “growing year” from April of one year through March of the next year. When flowering does occur in a given year, Brenskelle et al. (2021) found that it is likely to occur following cold and dry conditions. In addition, Yoder et al. (2024) found that flowering is more likely to occur when the maximum vapor pressure deficit (i.e., measure of drought stress on the landscape) is lower in the growing year before flowering and the minimum vapor pressure deficit is relatively stable since the previous growing year. These vapor pressure deficits align with lower drought stress leading up to flowering (Yoder et al. 2024). Flowering was also found to more likely occur when the minimum temperature the growing year before flowering was above freezing and when the maximum temperature has been relatively stable since the previous growing year (Yoder et al. 2024). This finding is consistent with observations that suggest Joshua trees flower much more often in locations that are historically warmer (St. Clair and Hoines 2018) and that winter low temperatures limit distribution of flowering (Dole et al. 2003); however, these findings contradict speculation that freezing triggers flowering (Brenskelle et al. 2021; Rodgers 2023). In addition, Yoder et al. (2024) found that the median interval between flowering years has decreased from historical (i.e., early 20th century) levels of flowering every 5 years to every 4 years.

## POLLINATION



Yucca moth larva inside Joshua tree fruit.  
Source: Anna Cirimele, National Park Service.

Western Joshua tree relies on the yucca moth (*Tegeticula synthetica*) for pollination and is not pollinated by other insects in California or by wind. The relationship between these two species is an obligate pollination mutualism, meaning both species rely on the other for successful sexual reproduction. The yucca moth pollinates western Joshua tree, and western Joshua tree provides food (i.e., western Joshua tree seeds) for the developing moth larvae. Many yucca moth species (*Tegeticula* and *Parategeticula*) are specialized pollinators

for *Yucca* species (Smith and Leebens-Mack 2024). Eastern Joshua tree's obligate pollinating yucca moth (*Tegeticula antithetica*) is not known to co-occur with western Joshua tree in California but is capable of pollinating western Joshua tree where they co-occur in Nevada, though significantly fewer larvae survive compared to when the moth oviposits on its preferred host (Smith et al. 2009). Yucca moth species aggregate on the flowers of *Yucca* species and





mate within the inflorescence (i.e., group or clusters of flowers on one main stem on a plant) (Smith and Leebens-Mack 2024). *Yucca* species appear to have adapted to yucca moth pollination by having a low pollen-to-ovule ratio, low nectar production, and the ability to abort fruits when they are over exploited (Smith and Leebens-Mack 2024). Although pollination from its yucca moth does impose a cost on the western Joshua tree through the larval consumption of its seeds, both it and its yucca moth pollinator rely on successful seed development for survival.

Yucca moths pollinate Joshua tree by using unique, specialized tentacles to purposefully place pollen into the stigma after egg laying (Smith and Leebens-Mack 2024). This active pollination process in Joshua tree and other *Yucca* species ensures development of seeds for the moth offspring by transferring pollen efficiently, leading to lower pollen-to-ovule ratio (Pellmyr et al. 2020). Yucca moths are also known to lay eggs into the Joshua tree floral ovary, and the growing larvae consume a portion of the fertilized seeds resulting in a tight codependence between each species for survival (Trelease 1893; Pellmyr 2003; Smith and Leebens-Mack 2024). The yucca moths' ovipositor (through which they lay their eggs) length correlates with the style length of the western Joshua tree flower, which allows for successful egg laying in the seed ovules (Smith et al. 2009). Research in the San Bernardino Mountains found approximately 19.5 and 42.8 percent of seeds were damaged by larvae in 2013 and 2014, respectively (Borchert and DeFalco 2016). In yucca plant–yucca moth relationships, typically 5 to 30 percent of the seed crop is consumed, although it can be up to 90 percent (Smith and Leebens-Mack 2024). Although there are costs from larval predation of seeds, western Joshua tree needs its yucca moth for successful sexual reproduction.

For all species of yucca moth, eggs typically hatch in 7 days (Smith and Leebens-Mack 2024). In late summer, the moth larvae fall to the ground from the Joshua tree fruits and enter diapause (i.e., suspended development) (Pellmyr 2003). This stage of diapause can likely last for several years, although the environmental or other cues that trigger metamorphosis into adult moths are not currently known (Pellmyr 2003). The environmental factors that lead to the survival of the yucca moth are not well understood, nor are the components of the natural communities that support both western Joshua tree and the yucca moth. The range of the yucca moth, and therefore the range where western Joshua tree can sexually reproduce, is also not well understood but can be estimated as the range in which pollination and fruiting occurs. Yucca moth presence was recorded in Joshua Tree National Park at study sites from approximately 1,049 to 2,076 meters (3,442 to 6,811 feet) in elevation, but not at the study sites with the lowest (1,004 meters [3,294 feet]) or highest (2,212 meters [7,257 feet]) elevation (Harrower and Gilbert 2018). More research is needed to understand whether the results of this study apply to yucca moth populations elsewhere.





Source: Matt Berger.

Following the yucca moth's pollination of western Joshua tree, fruits containing seeds are produced. The number of fruits and seeds produced by western Joshua trees vary greatly from year to year (Borchert and DeFalco 2016; Wilkening et al. 2020). Borchert (2022) reported approximately 80 seeds in mature western Joshua tree fruits. In research conducted in the San Bernardino Mountains at approximately 1,776 meters (5,827 feet) in elevation, fruits reached full size in late May (Borchert and DeFalco 2016), although timing of the maturing of fruits likely varies at other locations along the elevational gradient of western Joshua tree. Preliminary data show that areas with high fruit production tend to be colder and wetter with uniform precipitation, and sites that differ in the amount of fruit production have significantly different climates (Smith, pers. comm., 2024).

The production of fruits and seeds fluctuates yearly and is dependent upon the number of adults (i.e., defined as flowering Joshua trees) that are present, the presence of yucca moth, and the amount of moisture available while fruits are in development. However, the relative influence of each of these on the abundance and timing of fruit set for Joshua tree has yet to be determined. In one study in Joshua Tree National Park, pollinator abundance, flowering, and seed production were all found to be lowest at the high elevation sites (Harrower and Gilbert 2018). Pollinator abundance was found to be the most limiting factor to viable seed production because seed production is positively correlated with yucca moth presence (Harrower and Gilbert 2018); however, these conclusions may not be generalizable over the entire range of western Joshua tree. For example, the study had a limited sample size, fine-scale variation in seed production, and moth presence within any one site (even at sites in the same climate and elevation zones), which may have captured normal spatial variation in seed production as opposed to variation due to elevation (Smith, pers. comm., 2024). In addition, the study was conducted in a location that represents a small window of climate variation compared to the range of the species (Smith, pers. comm., 2024).



### SEED DISPERSAL

Dispersal of Joshua tree seeds is primarily facilitated by other species, so the capacity for the species to expand into unoccupied habitat is dependent on those species. Prehistorically, Joshua tree seeds may have been dispersed long distances by extinct megafauna, including the Shasta ground sloth (*Nothrotheriops shastensis*) and relatives of the elephant (Lenz 2001). However, using genetic data, Smith et al. (2011) found no evidence of a change in the rate of Joshua tree dispersal corresponding with the timing of the extinctions of such herbivores, which would be expected if they were important Joshua tree seed dispersers.

Currently, seeds of western Joshua tree are dispersed by scatter-hoarding rodents (see Section 4.2, below) that either collect seeds from the canopy of western Joshua tree or the ground below and bury the seeds a short distance from the tree (Vander Wall et al. 2006; Waitman et al. 2012; Borchert 2016). Primary dispersal (first caching of seeds) distances of western Joshua tree seeds by seed-caching small rodents of up to 56.6 meters (186 feet) have been observed, with secondary dispersal (re-caching of seeds) distances of up to 32.2 meters (106 feet) (Vander Wall et al. 2006). The average historical migration rate of Joshua tree over the Holocene period has been estimated to be up to 2 meters (6.6 feet) per year (Cole et al. 2011). Research from Esque et al. (2023) indicates small founder trees occur less than 1 kilometer (0.6 mile) from the edge of established Joshua tree stands. Other mechanisms of dispersal for Joshua tree seeds have also been suggested including wind, other mammals, and birds (e.g., California scrub-jay [*Aphelacoma californica*]) (Lenz 2001; Borchert 2016).

### SEED GERMINATION

Joshua tree seed germination is dependent on favorable environmental conditions that, when absent, seem to result in low rates of seed viability and germination success. While Joshua tree seed germination occurs readily in controlled laboratory conditions (Wallace and Romney 1972; McCleary 1973; Gucker 2006; Bonner and Karrfalt 2008; Waitman et al. 2012; Birker, pers. comm., 2021), seed germination rates decrease dramatically following dispersal in the wild. To model seed viability in the wild, one study conducted in the range of eastern Joshua tree found that after 1 year in an underground cache, approximately 50 to 68 percent of eastern Joshua tree seeds recovered from the field germinated in the lab (Reynolds et al. 2012). After 3 years and 4 months in an underground cache, less than approximately 1 to 3 percent of eastern Joshua tree seeds were able to germinate (Reynolds et al. 2012), suggesting that at least eastern Joshua tree has limited capacity to maintain seed viability in soil for long periods of time. Seed viability may be longer when protected within fruits compared to when loose in the soil. It is possible that uneaten fruits in the tree canopy function as an aerial seedbank, which likely occurs more frequently in masting years when fruit production is high enough to provide ample food for larvae and seed predators (Borchert and DeFalco 2016). One high



desert study found that seeds were ready to germinate in mid-June, approximately 14 days after the Joshua tree fruit reached full size (Borchert and DeFalco 2016).

After dispersal, western Joshua tree seeds appear more likely to germinate following a rain event (Went 1948; Reynolds et al. 2012) and may germinate fastest at approximately 25 degrees Celsius (77 degrees Fahrenheit), as was found in one study for eastern Joshua tree seeds when testing germination in four different temperature conditions (McCleary 1973). Following germination, seedling emergence above the soil from the shoot (i.e., stem and attached organs, such as leaves and flowers) of the plant seems to be greatest in the spring and summer when increased soil moisture and warm soil temperatures co-occur. However, seedlings seem to also emerge at other times of the year, which suggests some potential for adaptation to shifting conditions (Reynolds et al. 2012). Seedling emergence is likely increased when seeds are buried approximately 1 to 3 centimeters (0.4 to 1.2 inches) below the surface (Waitman et al. 2012). Seeds that are left unburied on the soil surface seldom germinate (Waitman et al. 2012). Seed germination and seedling emergence seem to be most successful under nurse plants (e.g., shrubs) compared to out in the open (Vander Wall et al. 2006; Reynolds et al. 2012; Waitman et al. 2012).

## RECRUITMENT AND ESTABLISHMENT

As with many plants, western Joshua tree recruitment—the process by which individuals are added to a population, usually by the addition of new individuals from on-site reproduction—can be limited by seed availability and other constraints on seedling establishment (Grubb 1977; Clark et al. 1999; Clark et al. 2007). In some instances, recruitment may refer to clonal offspring, but seedling recruitment, which includes the processes of seed germination, seedling survivorship, and seedling growth, is more common (Eriksson and Ehrlén 2012). Recruitment plays a role in maintaining stable populations if, on average, a reproductive individual is replaced by a successfully recruited offspring (Eriksson and Ehrlén 2012). Seedling establishment of Joshua tree appears to be infrequent because it requires seedling germination and survivorship, and establishment only occurs when the plant begins to photosynthesize (which will allow the plant to grow) (Reynolds et al. 2012). Few Joshua tree seedlings have been observed in the field, particularly at lower elevations (Webber 1953; Wallace and Romney 1972; Comanor and Clark 2000; Esque et al. 2010); however, for younger western Joshua trees, higher survival rates have been observed in western and higher elevation areas (DeFalco et al. 2010; St. Clair and Hoiner 2018; Sweet et al. 2019). Sparse seedling observations in some locations may be because of the lower density of Joshua trees or the influence of more recent factors, such as drought, climate change, and invasive species. Sweet et al. (2019) found that higher recruitment of western Joshua tree occurred in areas that had significantly higher annual precipitation, and marginally significantly lower climatic water deficit and maximum temperature of the warmest quarter of the year. Successful seedling establishment likely





requires several successive years of sufficiently wet and/or cool conditions (Wallace and Romney 1972; Cole et al. 2011) and growth to a large size (i.e., approximately 25 centimeters [9.8 inches]) before the arrival of a period of drier and/or hotter conditions (Esque et al. 2015).



Source: Jeb Bjerke, California Department of Fish and Wildlife.

Like other desert plants, Joshua trees can survive with limited water by utilizing moisture reserves in intermediate and deep soils and moisture stored in leaves, trunks, and roots (Crosswhite and Crosswhite 1984). Joshua trees of all sizes seem to have relatively low mortality during periods of average to above-average rainfall (nearly zero in many years) (Esque et al. 2015). Time of year may also affect successful seedling establishment, with one study finding that seedlings survived the longest when emergence occurred in September, although 90 percent still experienced mortality (Reynolds et al. 2012).

Presence under a nurse plant (e.g., shrub)

appears to be critical for Joshua tree establishment (Waitman et al. 2012; Reynolds et al. 2012; Esque et al. 2015). This is likely because nurse plants provide a microclimate with higher soil moisture, lower soil temperature, less direct sun, a reduction in water loss to the atmosphere, and a reduction in drying effects from wind (Brittingham and Walker 2000; Legras et al. 2010). Nurse plants for western Joshua trees, such as blackbrush (*Coleogyne ramosissima*), creosote bush (*Larrea tridentata*), and other perennial plants, which likely provide favorable conditions for seedling growth and survival (Loik et al. 2000), potentially offer seedlings some protection from small mammal herbivory, as was found for singleleaf pinyon pine, where 69 percent of seedlings in one growing season emerged beneath nurse plants (Vander Wall 1997).

After establishment, western Joshua tree seedlings and very young plants appear to require sufficient soil moisture, periods of cold temperatures for optimal growth, and avoidance of consumption by herbivores to survive (Went 1957; Esque et al. 2015). One study found that young eastern Joshua tree plants produced the greatest average number of leaves when they were exposed to 10 hours of light (McCleary 1973). Another study investigating different metrics affecting Joshua tree growth found that western Joshua tree seedlings grow most successfully at root temperatures near 18 degrees Celsius (64 degrees Fahrenheit), compared to 10 degrees Celsius (50 degrees Fahrenheit) and 35 degrees Celsius (95 degrees Fahrenheit), and without calcium carbonate in the soil (Wallace and Romney 1972). Exposure to low temperatures may be required for optimal growth once Joshua trees have reached approximately 3 years of age (Went 1957).





Presence of arbuscular mycorrhizal fungi (i.e., soil microorganisms that can form mutualistic relationships with most terrestrial plants) in association with western Joshua tree seedling roots generally appears to have positive benefits for nitrogen absorption and plant biomass (Harrower and Gilbert 2021). Some species of arbuscular mycorrhizal fungi from low elevation areas in Joshua Tree National Park have been found to initially have negative impacts on 1- to 3-month-old western Joshua tree seedlings, but these became positive associations once seedlings reached 6 months old (Harrower and Gilbert 2021). A 22-year-long study of fifty-three 5- to 6-year-old individual western Joshua tree plants with an average height of approximately 21.5 centimeters (8.5 inches) found that 10 western Joshua tree plants with an average height of approximately 1 meter (3.3 feet) survived, an approximately 18.9 percent survival rate (Esque et al. 2015).

## ASEXUAL REPRODUCTION

Sexual reproduction (i.e., formation of a seed) is advantageous because it promotes genetically diverse offspring and, in turn, evolutionary adaptation (Hoffman and Sgrò 2011; Yang and Kim 2016), and can increase the dispersal ability of plant species (Winkler and Fischer 2002). However, when the absence of yucca moths precludes western Joshua tree sexual reproduction, the plant is also able to reproduce asexually. Asexual reproduction occurs by vegetative propagation from rhizomes (i.e., horizontal underground plant stems), branch sprouts, and basal sprouts, which generally remain attached to the parent plant. This could allow western Joshua tree individuals to survive indefinitely, although this has not been observed and may not be possible due to factors including normal stochastic processes (i.e., random events that can affect community and population dynamics), as well as shifting climate conditions. A young, asexually produced western Joshua tree is connected underground to the parent plant by rhizomes or basal shoots (Simpson 1975). Asexual reproduction can result in clumps of many individual stems emerging from the ground in the same vicinity that can be genetically identical, although, due to random genetic mutations in plant tissue, can sometimes be genetically different (Antolin and Strobeck 1985). Asexual reproduction in Joshua tree tends to increase at the edge of its range, as is the case with other plant species (Silvertown 2008), and has been reported to increase in frequency with increasing elevation (Rowlands 1978) and at lower elevations where there is no sexual reproduction (Harrower and Gilbert 2018). Western Joshua tree often reproduces asexually by resprouting following fire (Vogl 1967; Loik et al. 2000; Gucker 2006; DeFalco et al. 2010; Cornett 2022), and like Joshua tree asexual reproduction, fire is more frequent at higher elevation areas of the Mojave Desert (Brooks et al. 2018).



## GROWTH AND AGE

Mature trees can reach heights of approximately 5 to 20 meters (16.4 to 66 feet), although western Joshua trees rarely exceed 10 meters (33 feet) (Cornett 1997). Western Joshua trees often have one main trunk that branches approximately 1 to 3 meters (3.3 to 10 feet) above the ground, and older trees can have extensive branching and a large, rounded tree-like canopy. Western Joshua trees have a monopodial branching pattern (i.e., after branching, one stem remains dominant, even though the branches may appear to be approximately equal in size). Branching of western Joshua tree typically occurs after an inflorescence is produced at the end of a stem or after the growing tissue at the end of a stem is damaged, such as by the yucca weevil or yucca-boring weevil (*Scyphophorus yuccae*) (Simpson 1975).

Because Joshua tree trunks lack growth rings, tree height and annual growth rate assumptions are often used to approximate the age (Gilliland et al. 2006). These age estimates have a high level of uncertainty; however, they are still useful in providing information about the demographic structure of Joshua tree populations. Western Joshua trees that have reached reproductive maturity have high survivorship and are therefore likely to maintain reproductive potential for decades. Although it has been speculated that western Joshua tree may live hundreds or even thousands of years, the actual maximum lifespan of western Joshua tree is unknown (Cornett 2006; Gilliland et al. 2006). Generally, Joshua tree trunk diameters increase over time, although they have also been reported to decrease, perhaps because of drought (Gilliland et al. 2006). Mature Joshua trees may take advantage of infrequent rains by storing near-surface water collected through their extensive network of fibrous roots (Gucker 2006). Roots of eastern Joshua tree have been observed approximately 11 meters (36 feet) away from what appeared to be the aboveground portion of the plant (Bowns 1973). As is the case during western Joshua tree establishment, mycorrhizal associations that form with their roots may contribute to adult western Joshua tree survival (Harrower and Gilbert 2021).



Source: Tom Minczeski.



#### 4.1.4 Population Trends

Population trends may be measured directly, inferred from demographic information, or indirectly inferred from fossil evidence or environmental impacts that have occurred in the past. Population trends can be an important predictor for extinction risk (O'Grady et al. 2004). A sustainable western Joshua tree population would likely have high numbers of young plants, decreasing numbers of older plants, and relatively few old plants. In addition, the average western Joshua tree lifespan must remain longer than the generation length (i.e., time from seedling establishment to reproductive maturity) for populations to remain stable. Using a long-term average growth rate of approximately  $0.312 \pm 1.96$  centimeters per year (Esque et al. 2015), the generation length of western Joshua tree has been estimated to be 50 to 70 years (Esque et al. 2015).

Genetic analyses suggest that approximately 200,000 years ago, western Joshua tree experienced substantial population growth and range expansion from the Mojave Desert southeast into the Sonoran Desert and north-northeast into the Great Basin Desert (Smith et al. 2011). Studies on population trends of Joshua tree over the past 20,000 years are contradictory in their conclusions. Approximately 22,000 to 13,000 years ago, during the Late Pleistocene, the fossil record shows Joshua tree with a larger range compared to today, extending south farther into Southern California, Arizona, and likely into northwestern Mexico (Rowlands 1978; Holmgren et al. 2010; Cole et al. 2011; Smith et al. 2011). A larger range is not synonymous with greater abundance though, and research conducted by Smith et al. (2011) found no indication of significant range or population size reductions at the end of the last glacial period.

Toward the beginning of the Holocene period, approximately 11,700 years ago, fossil evidence indicates the Joshua tree southern range extent contracted northward for approximately 3,700 years until the range reflected the southern extent of today (Cole et al. 2011). This contraction began following an approximately 50-year period where rapid warming occurred, with the minimum winter temperature in the Grand Canyon increasing approximately 4 degrees Celsius (Cole and Arundel 2005) and mean annual sea surface temperature off the coast of Northern California increasing approximately 4 degrees Celsius (Barron et al. 2003). The apparent range contraction of Joshua tree represented in the fossil record starting in the Late Pleistocene suggests that the population of the entire range of Joshua tree has been in decline. However, research conducted by Smith et al. (2011) found no evidence to indicate population declines starting approximately 21,000 years ago, following the last glacial maximum. This suggests that loss of habitat within the southern portion of the Joshua tree range in California, starting in the Late Pleistocene, was potentially offset by habitat expansion in the northern extent of the range (Smith et al. 2011).



Although western Joshua tree has continued to occur within the same general geographical range in California since European settlement of the Mojave Desert, the population size and occupied areas within that geography have declined due to habitat modification and degradation related to land conversion for agriculture and development (Borge 2018; CDFW 2022). Development and other human activities that began with European settlement (see Section 4.3.2) have likely resulted in the greatest decline in the landscape-scale abundance of western Joshua trees in California. Given the limited understanding of western Joshua tree distribution before European occupation and current lack of range-wide population monitoring, this population decline can be estimated by using agricultural land use and development as a proxy to understand habitat loss after European occupation began. Along the southern extent of the western Joshua tree range in California, large portions of western Antelope Valley were cleared for alfalfa production (Borge 2018), which likely resulted in decline of western Joshua tree populations in the area. Large human population centers, particularly in the southern portion of the species range, coincide with large conspicuous areas free of western Joshua tree, including in western Antelope Valley and near the metropolitan areas of Palmdale and Lancaster, which correspond to areas historically cleared for agriculture (Figure 4-3). Agriculture, pasture, and urban data presented in Figure 4-3 were collected from approximately 1990 to 2014 (CAL FIRE 2022). In the past, these areas, as well as the developed areas of Victorville, Hesperia, and Yucca Valley, likely supported substantially more western Joshua trees. Approximately 30 percent of the habitat occupied by western Joshua tree in California may have been modified in the period between European settlement and the present (CDFW 2022).

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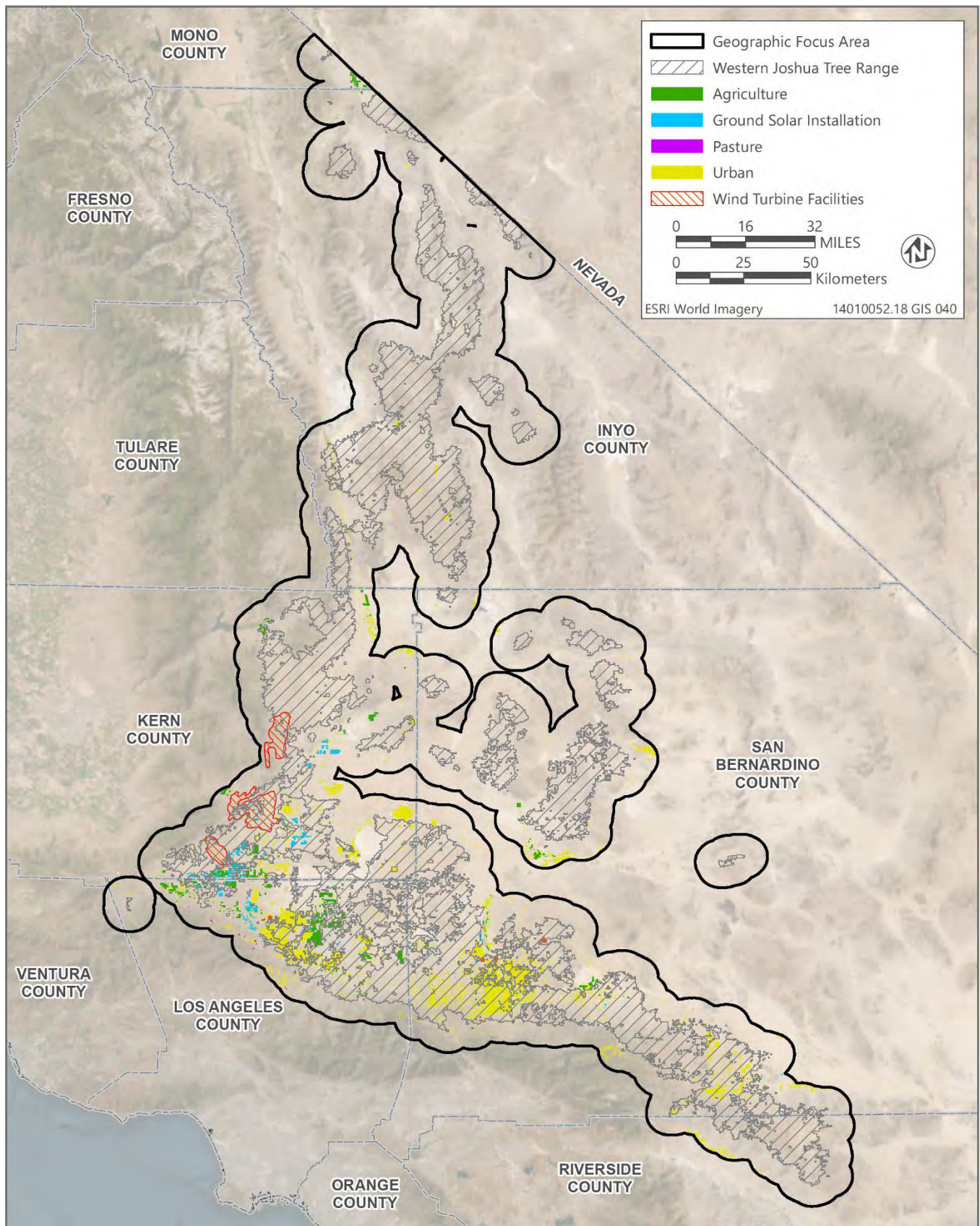
*"In the presence of the Joshua Tree, one cannot help but feel a profound connection to the natural world."*  
— John Muir

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On the local population scale, trends from available direct monitoring of western Joshua tree are not uniform, but several plots have shown declines in abundance, and observations of recruitment have been minimal (Esque et al. 2010; St. Clair and Hoines 2018; Natural Resources Group 2021; WEST 2021; CDFW 2022). According to the information available, local populations of western Joshua tree are currently exhibiting short-term demographic trends ranging from apparent increase or stability to apparent decline, but no uniform range-wide trend is evident. Demographic data on tree height at some locations show signs of drastic short-term declines in recruitment (CDFW 2022), some show a more gradual decline in recruitment (St. Clair and Hoines 2018), and others appear to be experiencing stable short-term recruitment levels at various locations throughout the species' range (Esque et al. 2010; CDFW 2022).







Sources: Hoen et al. 2018; CAL FIRE 2022; Esque et al. 2023; Fujita et al. 2023; adapted by Ascent in 2024.

**Figure 4-3** Converted Land Cover Uses within the Geographic Focus Area





## 4.2 WILDLIFE VALUES AND ECOLOGICAL FUNCTION OF WESTERN JOSHUA TREES

Western Joshua tree plays an important ecological role in the desert ecosystem. The species provides foraging opportunities, nesting habitat, and cover for many wildlife species, and supports a biodiverse ecosystem.

The yucca moth is western Joshua tree's obligate, mutualistic pollinating partner (see Section 4.1.3, above). Other moth species potentially parasitize western Joshua tree. Cheater yucca moth (*Tegeticula corruptrix*) is abundant throughout western Joshua tree's range; and while they lay eggs in Joshua tree flowers and feed on seeds, they do not pollinate them (Smith and Leebens-Mack 2024). Two bogus moth species are also known to lay eggs on Joshua tree flowers but do not pollinate them (Smith and Leebens-Mack 2024). *Prodoxus sordidus* lay eggs on the flower stalk, and *Prodoxus weethumpi* lay eggs on the outside of the fruit; however, their larvae do not feed on the seeds and are not considered a direct competitor to the yucca moth (Smith, pers. comm., 2022, cited in USFWS 2023).

Seed-dispersing wildlife includes scatter-hoarding mammals that rely on western Joshua tree seeds for nutrition. These species include the Mohave ground squirrel (*Xerospermophilus mohavensis*), which is listed as threatened under the California Endangered Species Act (CESA), and other species, such as white-tailed antelope squirrel (*Ammospermophilus leucurus*), Merriam's kangaroo rat (*Dipodomys merriami*), agile kangaroo rat (*Dipodomys agilis*), San Diego pocket mouse (*Chaetodipus fallax*), little pocket mouse (*Perognathus longimembris*), and pinyon mouse (*Peromyscus trueii*) (Zembal and Gall 1980; Borchert 2016). In addition, black-tailed jackrabbits (*Lepus californicus*) browse on western Joshua tree (Esque et al. 2015).



Source: Samantha Laarman, National Park Service.



Several bird species use Joshua trees for nesting and foraging. Scott's oriole (*Icterus parisorum*) often nests in the crown of Joshua trees and uses fibers stripped from dead leaves hanging below the living crown to construct their hanging, cup-shaped nests (Flood 2020). Ladder-backed woodpeckers (*Dryobates scalaris*) build nests in trunk cavities or limb holes of Joshua trees (Lowther et al. 2020). Swainson's hawk (*Buteo swainsoni*), a species listed as threatened under CESA, has been documented nesting in western Joshua trees in the Antelope Valley of the western Mojave Desert (Bloom et al. 2023). Tricolored blackbird (*Agelaius tricolor*), another species listed as threatened under CESA, has been observed foraging for arthropods within Joshua tree inflorescences in the Kelso Valley of Kern County (Terrill et al. 2019). In addition, common raven (*Corvus corax*) has been observed nesting and perching in Joshua tree branches (Abella et al. 2023). Other bird species that are associated with Joshua tree and may depend on the tree in the Mojave Desert region include cactus wren (*Campylorhynchus brunneicapillus*), loggerhead shrike (*Lanius ludovicianus*), and American kestrel (*Falco sparverius*) (Abella et al. 2023).

Joshua trees provide protection and feeding sites for some Mojave Desert lizard species. Desert night lizards (*Xantusia vigilis*) and desert spiny lizards (*Sceloporus magister*) are often found on Joshua tree bark and in clusters of dead leaves (Gucker 2006). Joshua tree woodland is also habitat for the federally listed threatened and state-listed threatened desert tortoise (*Gopherus agassizii*), which is known to construct burrows under fallen Joshua tree limbs (Abella et al. 2023).



American kestrel (*Falco sparverius*) on top of a western Joshua tree.

Source: Carmen Aurrecoechea, National Park Service.

Spiders, scorpions, beetles, and ants use dead Joshua tree leaves and fallen branches for refuge in the Mojave Desert (Gucker 2006). Other insect species feed on western Joshua trees regularly, including the yucca giant-skipper (*Megathymus yuccae*), Navaho yucca borer butterfly (*Megathymus yuccae navajo*), and yucca weevil. Yucca giant-skipper females glue eggs to the leaves of small host plants, and caterpillars feed near the tips of leaves and eventually bore into the ground at the base of the plant and feed on the root (Butterflies and Moths of North America 2023). Navaho yucca borer butterfly lays eggs on adult Joshua trees that arise from asexual growth, then the larvae bore into the rhizomes where they feed and later pupate (Jaeger 1965).

Yucca weevils have been observed eating the inflorescence, sap, and meristem (i.e., the region of cells capable of division and growth in plants) of western Joshua tree. Adult yucca weevils are thought to target flowering plants to bore into and lay their eggs (Heacox, pers.



comm., 2024). Yucca weevil grubs (i.e., larval form of certain beetle species) can be found on the ground, inflorescence, and leaf tips. The adult yucca weevil flies between trees, usually preferring to fly upwind for approximately 40 to 50 meters (131 to 164 feet). The adult stage is thought to last up to 2 years, and adults are easily identifiable because this species will wedge themselves head-first toward a western Joshua tree stem between leaves and can be observed with a hand lens. Yucca weevils have mostly been observed on western Joshua tree individuals that are about 1-meter (3.3 feet) tall, but these data may be biased due to challenges observing taller western Joshua trees.

Several special-status mammals associated with Joshua tree woodland include pallid bat (*Antrozous pallidus*), spotted bat (*Euderma maculatum*), American badger (*Taxidea taxus*), and bighorn sheep (*Ovis canadensis*) (Miller and Stebbins 1973).

In addition to the known ecological relationships with western Joshua tree described above, many other wildlife species and other organisms likely have ecological relationships with the species that are currently undiscovered.

### 4.3 KEY STRESSORS, THREATS, AND CONSERVATION ISSUES

Western Joshua tree has experienced increasing stressors since Europeans arrived in the Mojave Desert region. Modern-day threats to western Joshua tree include changes in precipitation and temperature patterns due to climate change;

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*“Nature’s resilience is mirrored in the Joshua Trees’ perseverance.”*  
— John Muir

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increased frequency and severity of wildland fire; proliferation of invasive species; and loss of habitat from land use disturbance, increases in urban and infrastructure development, and recreation or other human activities within the species’ range. These threats, coupled with the species’ biology (e.g., limited dispersal capacity and slow growth rate) and habitat requirements, are cause for concern that western Joshua tree abundance may decline substantially in California.

#### 4.3.1 Climate Change

California is experiencing increases in warming, droughts, variable precipitation, and intensity of heavy precipitation events due to climate change. These phenomena are predicted to worsen by the end of the 21st century (Garfin et al. 2013; Bedsworth et al. 2018). Climate change impacts to western Joshua tree are summarized in CDFW’s March 2022 status review of western Joshua tree (CDFW 2022). Since the status review, information identifying potential western Joshua tree climate refugia has also been developed, which can help evaluate climate impacts on the species. In general, climate refugia are areas that are expected to be



relatively buffered from contemporary climate change over time that enable persistence of valued physical, ecological, and sociocultural resources (Morelli et al. 2016). The direct and indirect effects of climate change are primary threats to western Joshua tree, and studies are increasingly investigating what detectable impacts to Joshua tree are occurring that should be attributed to these causes. For example, Yoder et al. (2024) found that Joshua trees are already experiencing impacts from climate change in the form of changes in the frequency of flowering events. In addition, areas of higher western Joshua tree recruitment have been observed within or significantly closer to predicted future climate refugia more often than areas of low recruitment (Sweet et al. 2019).

Changes in climate suitability for other species, particularly nurse plants of western Joshua tree, will also influence how western Joshua tree is affected by climate change. Singleleaf pinyon pine and blackbrush are some of western Joshua tree's nurse plants, which are important for the survival of western Joshua tree seedlings. Vulnerability assessments conducted by Barrows et al. (2014) show that singleleaf pinyon pine and blackbrush are highly vulnerable and likely vulnerable to climate change, respectively. In this study, Joshua tree itself was found to be likely vulnerable to climate change, although Joshua tree was found to be less vulnerable to climate change compared to singleleaf pinyon pine and blackbrush (Barrows et al. 2014). In addition, new climate suitability models by Thomas et al. (2023) show a much larger impact from climate change on blackbrush compared to western Joshua tree. The climate impacts on singleleaf pinyon pine and blackbrush could reduce the future availability of these western Joshua tree nurse plants, which could affect western Joshua tree's ability to survive past the seedling stage.

Because climate change may cause some areas currently occupied by western Joshua tree to become unsuitable for the species, western Joshua tree climate refugia will be important for maintaining populations of western Joshua tree in the future. Identifying western Joshua tree climate refugia is challenging because it relies on assumptions about global emissions scenarios, results from models of local climate conditions under those scenarios, and species distribution models. However, increasingly sophisticated species distribution models for Joshua tree have been prepared in recent decades (Thompson et al. 1998; Shafer et al. 2001; Dole et al. 2003; Cole et al. 2011; Barrows and Murphy-Mariscal 2012; Thomas et al. 2012; Sweet et al. 2019; Thomas et al. 2023). Furthermore, science identifying potential future climate refugia under three projected greenhouse gas emissions scenarios (described in Section 4.4) for western Joshua tree is currently in scientific review and uses newly released western Joshua tree range data from Esque et al. (2023). This new research provides the most accurate western Joshua tree range data to date, which allows models to predict refugia more accurately (Shryock et al. 2025). Preliminary results from this work, conducted by the US Geological Survey, have been shared with CDFW for consideration during preparation of this Conservation Plan (see Figure 4-4) and are presented in Section 4.4.





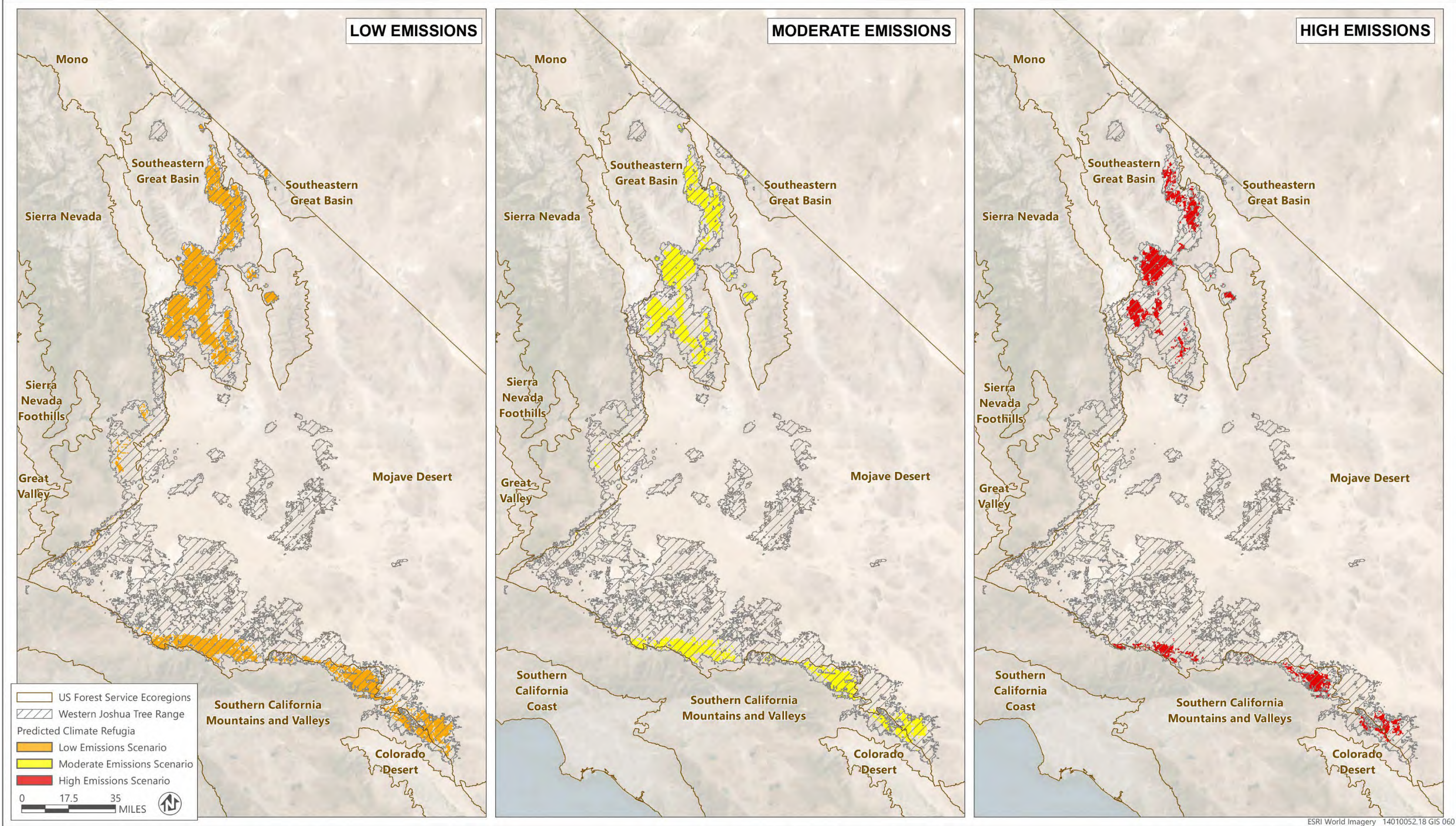


Figure 4-4 Predicted Climate Refugia





### 4.3.2 Development and Other Human Activities

Development and other human activities pose another threat to western Joshua tree and its habitat. Once disturbed, desert systems can be slow to recover due to their arid climate, delicate soils, and slow pace of ecological succession (Randall et al. 2010; Lovich and Ennen 2011). The western Joshua tree range in California has been disturbed by urban areas (which include industrial facilities), renewable energy installations (e.g., ground solar, wind turbine, and energy storage projects), agricultural areas, pastures used mainly for cattle grazing, and resource extraction facilities (Table 4-3; Figure 4-3) (CAL FIRE 2022; Fujita et al. 2023).

**Table 4-3     Converted Land Cover Uses within Western Joshua Tree Range in California**

| Types                                   | Area in Square Kilometers (sq mi) | Percent of Range (%) |
|-----------------------------------------|-----------------------------------|----------------------|
| Urban                                   | 646.0 (249.4)                     | 4.9                  |
| Wind turbine facilities <sup>1</sup>    | 219.6 (84.8)                      | 1.7                  |
| Agriculture                             | 34.1 (13.1)                       | 0.3                  |
| Ground solar installations <sup>2</sup> | 36.4 (14.1)                       | 0.3                  |
| Pasture                                 | 0.2 (0.1)                         | <0.1                 |
| <b>Grand total</b>                      | <b>936.2 (361.5)</b>              | <b>7.2</b>           |

Notes: sq mi = square miles.

<sup>1</sup> Wind turbine facilities include wind turbines, roads connecting wind turbines, and open areas.

<sup>2</sup> Ground solar installation data includes facilities with capacity of 1 megawatt or more that became operational before 2022.

Sources: Hoen et al. 2018; CAL FIRE 2022; Esque et al. 2023; Fujita et al. 2023; compiled by Ascent in 2024.

Western Joshua tree has been adversely affected by habitat modification and destruction since European settlement, particularly on unprotected, privately owned lands, and continues to be at substantial ongoing risk of additional habitat modification and destruction through development activities, such as for urban communities, renewable energy projects, and infrastructure. Aerial imagery and data from the US Geological Survey’s National Land Cover



Urban development

Database from 1984 to 2021 show continued development within western Joshua tree habitat in the southern portion of the species’ range in California in the cities of Palmdale, Lancaster, Yucca Valley, Joshua Tree, Twentynine Palms, Victorville, Hesperia, and Apple Valley (Krantz, pers. comm., 2021). A large portion of this recent habitat modification is the result of ongoing urban development, typically on private property near existing development. In addition, these privately owned lands are likely where housing development will occur in the future to



accommodate population growth in the region and to address the State's housing crisis (HCD 2022). In these areas, and on private lands in general, western Joshua tree and its habitat have had limited protective regulation prior to CESA candidacy. Approximately 34 percent of western Joshua tree's range in California is privately owned (see Table 2-1 in Chapter 2, "Planning Influences").

Stress from development can reduce western Joshua tree's ability to recruit from seed, which may occur in degraded or disturbed habitat. Western Joshua tree surveys conducted at development sites near the cities of Palmdale and Lancaster found that relatively few western Joshua trees have established from seed in recent decades (CDFW 2022). Development also has the potential to reduce habitat for scatter-hoarding rodents, leading to site abandonment or population declines and limiting western Joshua tree seed dispersal capacity and seed germination rates—both of which are facilitated by scatter-hoarding rodent behavior. In addition, development could eliminate nurse plants from the landscape, which can be critical for western Joshua tree germination and early survival.

The trend of land conversion for renewable energy is expected to continue (BLM 2016a; Smith et al. 2023), which would result in removal of western Joshua tree habitat and mortality of individual western Joshua trees due to the physical impact of land clearance for increased renewable energy development to address climate change (Smith et al. 2023). In recent decades, renewable energy development has been increasing rapidly in the Mojave Desert, mainly on privately owned land and federal lands managed by the Bureau of Land



Source: Carmen Aurrecoechea, National Park Service.



Management (BLM). To meet California’s goals for reduced carbon emission, millions of acres of the Mojave Desert could potentially be converted for renewable energy development; however, there are also conservation areas protected in accordance with the Desert Renewable Energy Conservation Plan (DRECP) (Smith et al. 2023), which has avoidance and minimization measures for Joshua tree woodlands. An update to a Mojave Desert ecoregional assessment (Randall et al. 2010) conducted by Parker et al. (2018) considered two areas of increased renewable energy development. The updated analysis showed that habitat with high conservation value was lost at a higher rate than habitat with low conservation value (Parker et al. 2018).

DRECP has designated focus areas for renewable energy development that overlap with approximately 0.7 percent of the western Joshua tree range in California; approximately 35.1 percent of the development focus areas overlap ecologically core or ecologically intact habitat (Randall et al. 2010; BLM 2016b; Parker et al. 2018). However, DRECP only applies to BLM-owned lands, whereas 60 percent of California’s current renewable energy projects are located on private land (USFWS 2023).



Grazing cows rest by a Joshua tree.

Grazing allotments and permits on federal lands overlap almost a quarter of the western Joshua tree range in California, mostly in the central and northern portions of the range (Table 4-4; Figure 4-5). Pasture land mapped by CAL FIRE (2024a) is minimal in the geographic focus area and only overlaps the western Joshua tree range in California in small patches in the southern and southwestern portions within Los Angeles County and in the eastern portions within Inyo County (Figure 4-3). Grazing can directly destroy or indirectly damage western Joshua trees by animals trampling or consuming individual western Joshua trees, likely young individuals, or nurse plants.

**Table 4-4     Grazing within Western Joshua Tree Range in California**

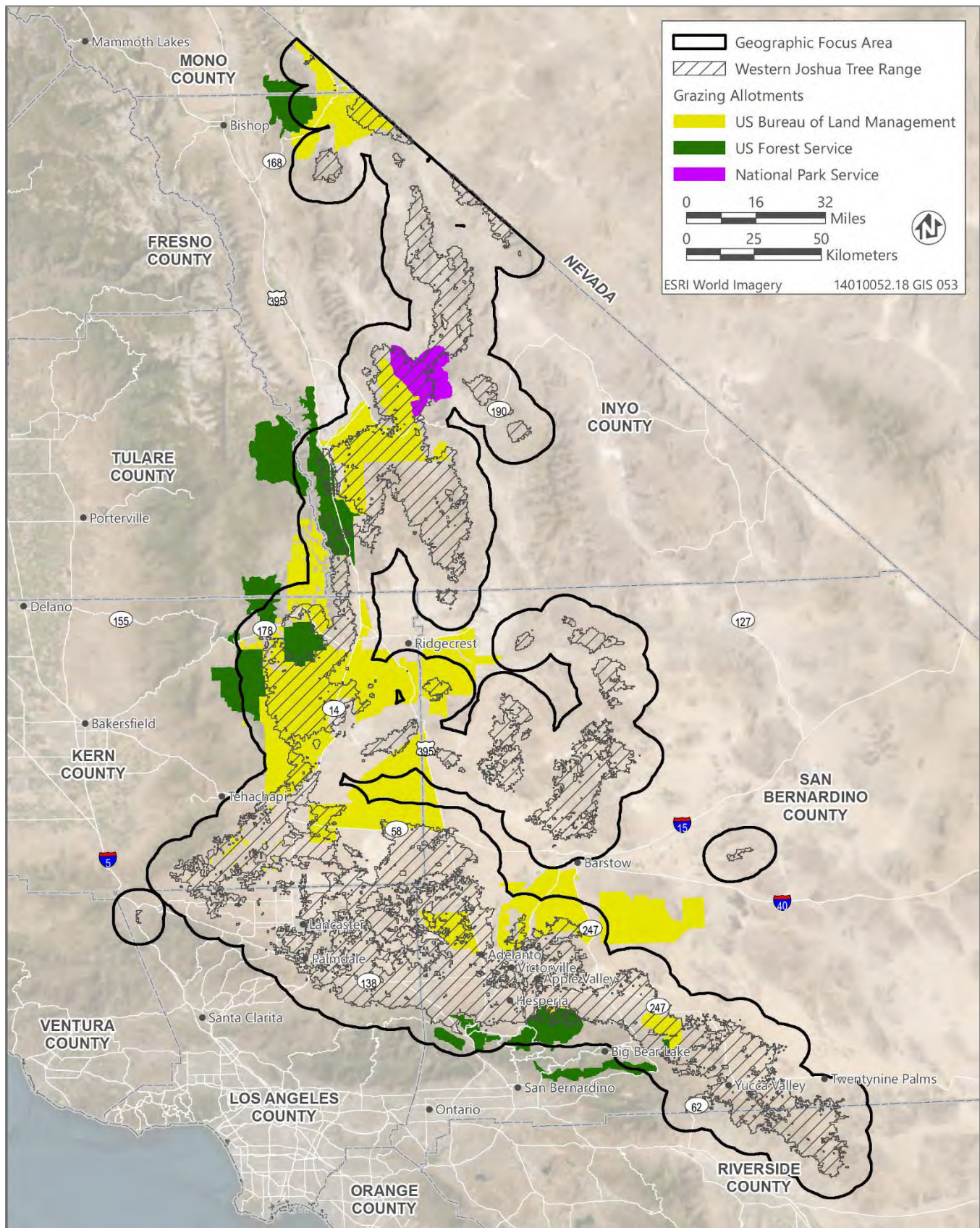
| Types                                       | Area in Square Kilometers<br>(sq mi) | Percent of Range (%) |
|---------------------------------------------|--------------------------------------|----------------------|
| Bureau of Land Management grazing allotment | 2,589.6 (999.9)                      | 19.8                 |
| National Park Service grazing permit        | 240.5 (92.9)                         | 1.8                  |
| US Forest Service grazing allotment         | 230.6 (89.0)                         | 1.8                  |
| <b>Grand total</b>                          | <b>3,060.8 (1,181.8)</b>             | <b>23.4</b>          |

Notes: sq mi = square miles.

Sources: Esque et al. 2023; McNeill, pers. comm., 2024; USFS 2024; BLM n.d.; compiled by Ascent in 2024.







Sources: Esque et al. 2023; McNeill, pers. comm., 2024; USFS 2024; BLM n.d.; adapted by Ascent in 2024.

**Figure 4-5 Grazing on Federal Land Overlapping the Geographic Focus Area**





An estimated 43 to 46 percent of modeled Joshua tree habitat is managed for multiple uses and is subject to resource extraction or open for unauthorized OHV use (Smith et al. 2023). On public land, incompatible recreational uses also pose a threat to western Joshua tree. Off-highway vehicles (OHVs) traveling off authorized trails and routes can crush young western Joshua trees and nurse plants and either damage or kill them. Western Joshua tree individuals and nurse plants can be trampled by outdoor recreationists, used as attachment points for hammocks and slacklines, and are sometimes collected for firewood. OHVs and campfires have the potential to start fires in western Joshua tree habitat. In addition, outdoor recreation and OHV use have the potential to spread and proliferate invasive species that compete with other plants including nurse plants, act as a fuel source for fire, and create fuel connectivity in Joshua tree habitat.

Impacts from development and other human activities can eliminate western Joshua tree habitat or degrade the quality habitat without eliminating it entirely. Habitat degradation can include habitat fragmentation from clearing for development; soil disturbance and compaction (including degradation or removal of biocrusts); introduction and spread of invasive plants (see Section 4.3.4 below), including more fire-prone invasive grasses; introduction and spread of pathogens; increased dust, pollution runoff, and trash; artificial noise, light, and vibration; and use of herbicides, pesticides, and other chemicals. Land clearing for development and agriculture has resulted in the fragmentation of remaining populations across the landscape, particularly in the species' southern range (Figure 4-3).



Source: Samantha Laarman, National Park Service.





Habitat fragmentation can have impacts to individual species or entire ecosystems, which can include increased edge effects, a reduced ability of species to migrate or colonize, and reductions in species richness (i.e., number of total species) (Haddad et al. 2015). The impacts of habitat fragmentation on western Joshua tree and the yucca moth, as well as their mutualism, are not well understood. Because western Joshua tree is a poor disperser, habitat fragmentation could disrupt population dynamics for the pollinator and plant by altering plant or pollinator densities and changing pollinator behaviors (Xiao et al. 2016). In addition, as fragmentation increases, specialists (i.e., organism adapted to a specific habitat and/or specific diet) such as the yucca moth needed for western Joshua tree reproduction, may decrease in number from the fragmented area while generalists (i.e., organism that occurs in a wide range of habitats and can use a wide variety of resources) become more prevalent (Xiao et al. 2016).

Development, herbicide application, raking, and clearing, and other human activities may have additional impacts on the yucca moth, such as accidental fire ignition, compaction of the soil, and trampling of yucca moths while they are dormant in the soil, or as adults. A lower abundance or absence of yucca moths would reduce sexual reproduction in western Joshua tree individuals, lowering recruitment, and in turn, lowering numbers of new western Joshua tree.

Native shrub communities associated with western Joshua tree in the Mojave Desert can take 100 years or more to recover to their original species composition and structure following disturbance if no action is taken, and perennial plants took an average of 76 years to reestablish following disturbance in an examination of 47 published studies (Abella et al. 2023). Studies evaluating postfire recovery of Mojave Desert shrub communities indicate that these systems may not be capable of achieving species composition similar to prefire conditions without active restoration (Abella et al. 2023). With wildland fire becoming an increasing threat to western Joshua tree, potentially degrading large areas of occupied habitat, restoration of burned sites will be a necessary component of species conservation, which may require many decades of recovery time. In addition, as land is cleared for development, biocrusts can be degraded or eliminated and can take decades to centuries to recover, depending on the impact (Kidron et al. 2020). Estimated biocrust recovery time after the severe disturbance of soil stripping (i.e., full removal of topsoil/A-horizon) by heavy machinery can take anywhere from 56 to 2,000 years (Kidron et al. 2020). Comparatively, biocrust recovery after the severe disturbance of biocrust removal (i.e., removal of 2 to 3 centimeters [approximately 0.7 to 1.2 inches] of topsoil) can take anywhere from 40 to greater than 250 years (Kidron et al. 2020).

### 4.3.3 Wildland Fire

Wildland fire poses a substantial threat to western Joshua tree. Wildland fire impacts to western Joshua tree are summarized in CDFW's March 2022 status review of western Joshua tree (CDFW 2022), and additional information on wildland fire impacts since the status review is also



presented. Although fire is a key component of most California ecosystems (Keeley et al. 2012; Sugihara et al. 2018), California deserts, where a large part of the western Joshua tree range is located, experience fire generally at a lower frequency and lesser severity compared to many other California ecosystems. Fires that occur in California's southeastern deserts are limited by fuel availability, and California deserts in general tend to have relatively long fire return intervals (i.e., time between fires) (Sawyer et al. 2009; Brooks et al. 2018). One study estimated a fire return interval for middle elevation areas of the Mojave Desert at approximately 687 years (Brooks et al. 2018). Since Joshua trees can be present in forest, shrub, and grassland ecosystems, the fire return intervals to which Joshua tree is subject can vary greatly. Fires occurring from 1900 to present in the western Joshua tree range in California have mostly burned the landscape within the western and southern edges of the range (CAL FIRE 2023).



Source: Hannah Schwalbe, National Park Service.

Historical fire regime modeling has been developed with input from more than 800 experts throughout the United States during 5 years of workshops using scientific literature, local data (e.g., inventory and monitoring data), and expert judgment (Blankenship et al. 2021). Historical fire regime modeling is presented by elevation in Table 4-5 and shows that the large majority of the western Joshua tree range in California has a V-A fire regime, which is defined as fire burning at

any severity with a fire return interval of 201 to 500 years (Figure 4-6) (LANDFIRE 2024). This historical fire regime constitutes the majority of all elevation classes, except the high elevation class, which is mostly classified as having a III-B fire regime. The III-B fire regime is defined as having less than 66.7 percent of percent replacement fire (i.e., area that burned hot enough to eliminate all or a majority of vegetation) and a fire return interval of 101 to 200 years. Historical fire regime modeling shows that more than 76 percent of the western Joshua tree range in California has a fire return interval that is at least 100 years or greater, and 14 percent is classified as non-burnable; thus, only approximately 9 percent of the range in California has a historical fire regime of 100 years or less. Fires with perimeters greater than 2,023 hectares (5,000 acres) are mapped in Figure 4-7. The areas and percentage of the western Joshua tree range in California that burned more than once (i.e., reburned) are presented in Table 4-6. The reburn data presented in Table 4-6 shows a decrease in fire return interval within the western Joshua tree range in California. compared to historical fire regime modeling, which classified most of the range in California as having between a 101- and 500-year or 501-year or greater fire return intervals with approximately 64 percent of the range in California having between a 201- and 500-year fire return interval.



**Table 4-5 Historical Fire Regimes by Elevation within the Western Joshua Tree Range in California**

| Historical Fire Regime                                                                             | Low Elevation <sup>1</sup><br>(percent of range) | Middle-Low Elevation <sup>1</sup><br>(percent of range) | Middle-High Elevation <sup>1</sup><br>(percent of range) | High Elevation <sup>1</sup><br>(percent of range) | Total<br>(percent of range) |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|-----------------------------|
| <b>I-B:</b> Percent replacement <sup>2</sup> fire less than 66.7%, fire return interval 6–15 years | 0.3                                              | 0.9                                                     | 0.3                                                      | <0.1                                              | 1.5                         |
| <b>I-C:</b> Percent replacement fire less than 66.7%, fire return interval 16–35 years             | 0.3                                              | 0.4                                                     | 0.2                                                      | <0.1                                              | 0.9                         |
| <b>II-A:</b> Percent replacement fire greater than 66.7%, fire return interval 0–5 years           | 0                                                | <0.1                                                    | 0                                                        | 0                                                 | <0.1                        |
| <b>II-C:</b> Percent replacement fire greater than 66.7%, fire return interval 16–35 years         | <0.1                                             | 0                                                       | 0                                                        | 0                                                 | <0.1                        |
| <b>III-A:</b> Percent replacement fire less than 80%, fire return interval 36–100 years            | <0.1                                             | <0.1                                                    | <0.1                                                     | <0.1                                              | <0.1                        |
| <b>III-B:</b> Percent replacement fire less than 66.7%, fire return interval 101–200 years         | <0.1                                             | 0.1                                                     | 0.8                                                      | 0.7                                               | 1.6                         |
| <b>IV-A:</b> Percent replacement fire greater than 80%, fire return interval 36–100 years          | 1.2                                              | 4.1                                                     | 1.4                                                      | 0.1                                               | 6.7                         |
| <b>IV-B:</b> Percent replacement fire greater than 66.7%, fire return interval 101–200 years       | 0.4                                              | 4.1                                                     | 0.7                                                      | 0.1                                               | 5.3                         |
| <b>V-A:</b> Any severity, fire return interval 201–500 years                                       | 34.9                                             | 18.1                                                    | 10.4                                                     | 0.6                                               | 64.0                        |
| <b>V-B:</b> Any severity, fire return interval 501 or more years                                   | 1.5                                              | 2.8                                                     | 1.3                                                      | <0.1                                              | 5.6                         |
| <b>Total</b>                                                                                       | <b>48.0</b>                                      | <b>34.3</b>                                             | <b>16.1</b>                                              | <b>1.6</b>                                        | <b>–</b>                    |

Notes: m = meters; ft = feet. Approximately 14.4 percent of the western Joshua tree range is not included in this analysis and was classified as non-burnable agriculture or other non-burnable categories.

<sup>1</sup> The elevational range of western Joshua tree was divided into four equal range classes: low elevation: 585–1,105.9 meters (1,919–3,628 feet); middle-low elevation: 1,106–1,625.9 meters (3,629–5,334 feet); middle-high elevation: 1,626–2,145.9 meters (5,335–7,040 feet); high elevation: 2,146–2,675.9 meters (7,041–8,780 feet).

<sup>2</sup> Percent replacement fire refers to the area that burned hot enough to eliminate all or a majority of vegetation.

Source: Esque et al. 2023; LANDFIRE 2024; compiled by Ascent in 2024.

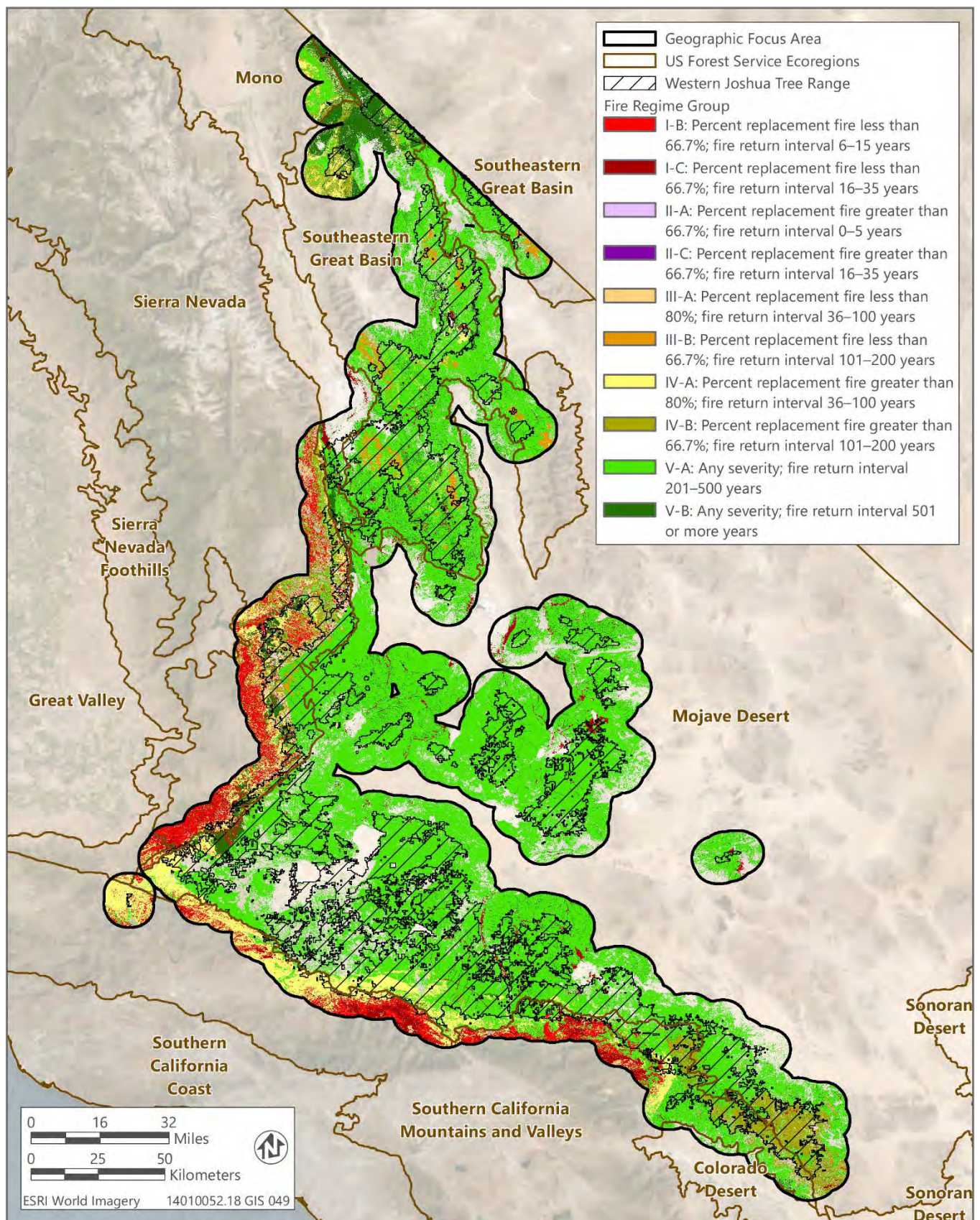
**Table 4-6 Reburns from 1916 through 2023 within the Western Joshua Tree Range in California**

| Number of Reburns        | Area in Hectares (acres)    | Percent of Range |
|--------------------------|-----------------------------|------------------|
| One                      | 69,822.3 (172,534.6)        | 5.3              |
| Two                      | 14,541.6 (35,933.2)         | 1.1              |
| Three                    | 2,390.1 (5,906.0)           | 0.2              |
| Four                     | 154.1 (380.8)               | <0.1             |
| Five                     | 76.8 (189.8)                | <0.1             |
| <b>One or more times</b> | <b>86,984.9 (214,944.5)</b> | <b>6.6</b>       |

Source: CAL FIRE 2023; Esque et al. 2023; compiled by Ascent in 2024.





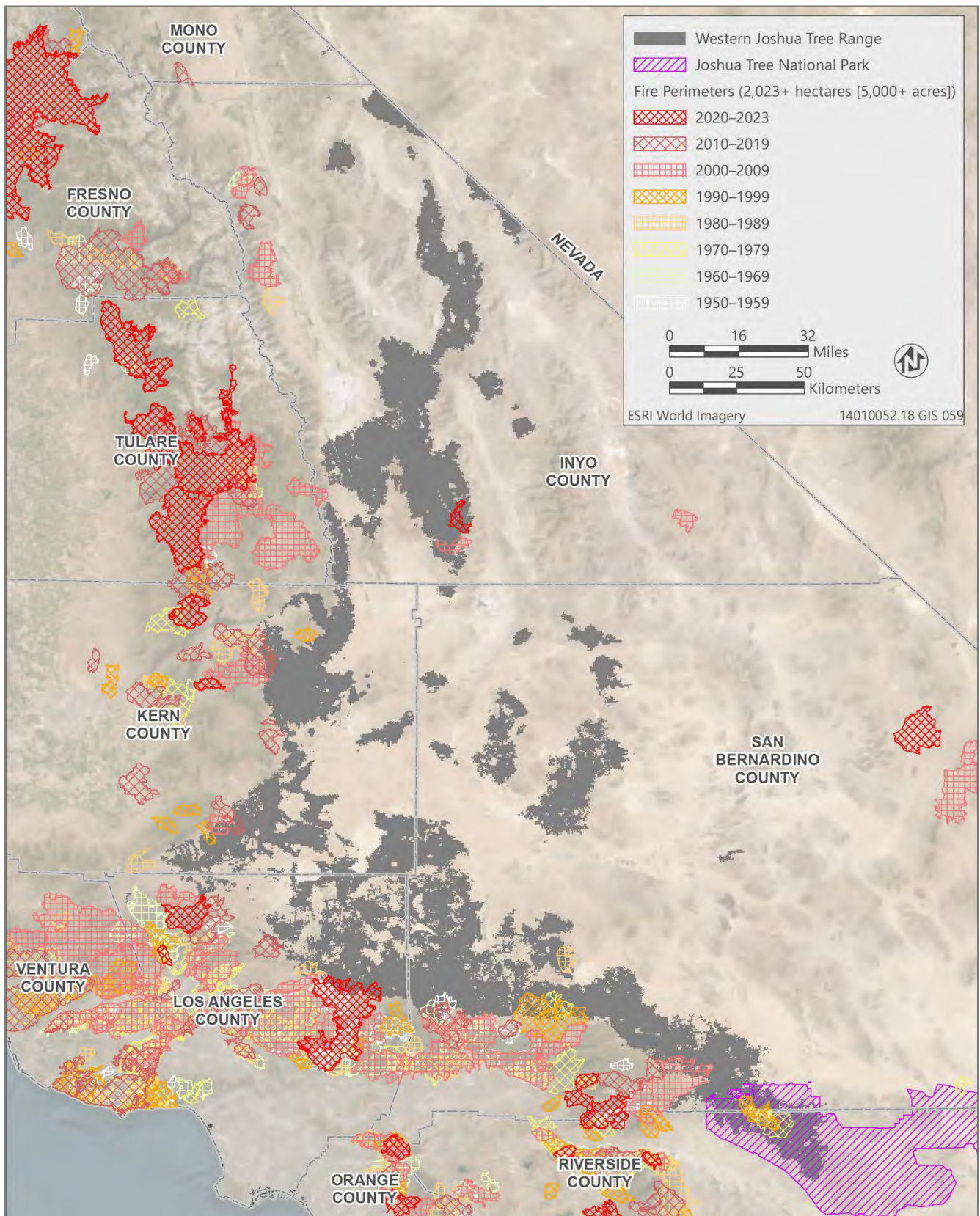


Source: Esque et al. 2023; LANDFIRE 2024; USFS 2024; adapted by Ascent in 2024.

**Figure 4-6 Historical Fire Regimes within the Geographic Focus Area**







Sources: CAL FIRE 2023; Esque et al. 2023; adapted by Ascent in 2024.

**Figure 4-7 Fires Greater than 2,023 hectares (5,000 acres) within the Western Joshua Tree Range in California**





Demonstrating how rapidly a wildland fire can affect a dense Joshua tree population, the 2020 Dome Fire burned more than 17,892 hectares (44,211 acres) and was estimated to have fully burned approximately 1.1 million and partially burned 200,000 eastern Joshua trees (Kaiser, pers. comm., 2024). The Dome Fire occurred while several other fires were burning throughout California (Figure 4-8), which limited available firefighting resources and likely led to the fire burning for a longer



Source: Sasha Travaglio, National Park Service.

period. These types of conflicts with fire-fighting resources are anticipated to continue as the frequency of concurrent fires increases (USFWS 2023). Only 3 years later, the York Fire occurred in 2023, approximately 16 kilometers (10 miles) east of the Dome Fire perimeter and burned approximately 37,667 hectares (93,078 acres) within eastern Joshua tree habitat at the Mojave National Preserve (Figure 4-8) (CAL FIRE 2023). Combined, the Dome and York Fires burned approximately 14.5 percent of the eastern Joshua tree range in California in 3 years (Esque et al. 2023; CAL FIRE 2023).

Large scale fires can start from ignition sources including lightning strikes, escaped campfires, and combusting piles of mulch. Fire ignition from mulch piles is an issue in Los Angeles County where illegally dumped mulch can generate heat, combust, and develop into a wildland fire (Barger 2024).

Postfire vegetation changes can impede the distribution and recovery of native plant species and communities. Increases in fire size and decreases in fire return intervals within the western Joshua tree range can result in changes in vegetation conditions that can reduce the number of western Joshua trees, impair recruitment, and cause local extirpation of western Joshua tree populations. In addition to fire, these vegetation changes can also result from other disturbances, such as the onset of droughts, increased effects of climate change, and effects of continued land use development. Such vegetation change is referred to as “vegetation departure” – a landscape metric that measures how different the current vegetation on a landscape is from historical vegetation conditions. Vegetation departure is classified into categories ranging from very high to very low, indicating the percentage change from historical conditions. Within the range of western Joshua tree, the most substantial changes in vegetation conditions are classified as very high departure and have occurred along the southern edge of the range, likely creating highly vulnerable western Joshua tree populations in these areas (Figure 4-9) (LANDFIRE 2023). Very high vegetation departure is most prevalent in the middle-low elevation class in California for the species (Table 4-7). Most of this change is



concentrated at the southeastern tip of the species range, where there are large patches of very high vegetation departure conditions (Figure 4-9) that partially overlap Joshua Tree National Park. This very high vegetation departure within and around Joshua Tree National Park aligns with two overlapping fire perimeters that are mostly within the park boundaries (Figure 4-7), which likely contributed to the altered vegetation conditions.

**Table 4-7 Vegetation Departure Classifications by Elevation Classes within Western Joshua Tree Range in California**

| Elevation Classes                | Very Low (0–16% Departure)<br>(percent of range) | Low (17–33% Departure)<br>(percent of range) | Moderate to Low (34–50% Departure)<br>(percent of range) | Moderate to High (51–66% Departure)<br>(percent of range) | High (67–83% Departure)<br>(percent of range) | Very High (84–100% Departure)<br>(percent of range) | Unclassified for Vegetation Departure <sup>1</sup><br>(percent of range) | Total (percent of range) |
|----------------------------------|--------------------------------------------------|----------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------|--------------------------|
| Low elevation class <sup>2</sup> | 24.7                                             | 0.6                                          | <0.1                                                     | 6.5                                                       | 2.6                                           | 0.3                                                 | 13.2                                                                     | 48.0                     |
| Middle-low elevation class       | 1.9                                              | 1.4                                          | 1.0                                                      | 18.2                                                      | 2.1                                           | 3.6                                                 | 6.0                                                                      | 34.3                     |
| Middle-high elevation class      | <0.1                                             | 1.4                                          | 1.4                                                      | 10.4                                                      | 1.1                                           | <0.1                                                | 1.8                                                                      | 16.1                     |
| High elevation class             | <0.1                                             | 0.9                                          | 0.1                                                      | 0.6                                                       | <0.1                                          | 0                                                   | 0.1                                                                      | 1.7                      |
| <b>Total</b>                     | <b>26.7</b>                                      | <b>4.3</b>                                   | <b>2.5</b>                                               | <b>35.7</b>                                               | <b>5.8</b>                                    | <b>3.9</b>                                          | <b>21.0</b>                                                              | <b>-</b>                 |

Note: m = meters; ft = feet.

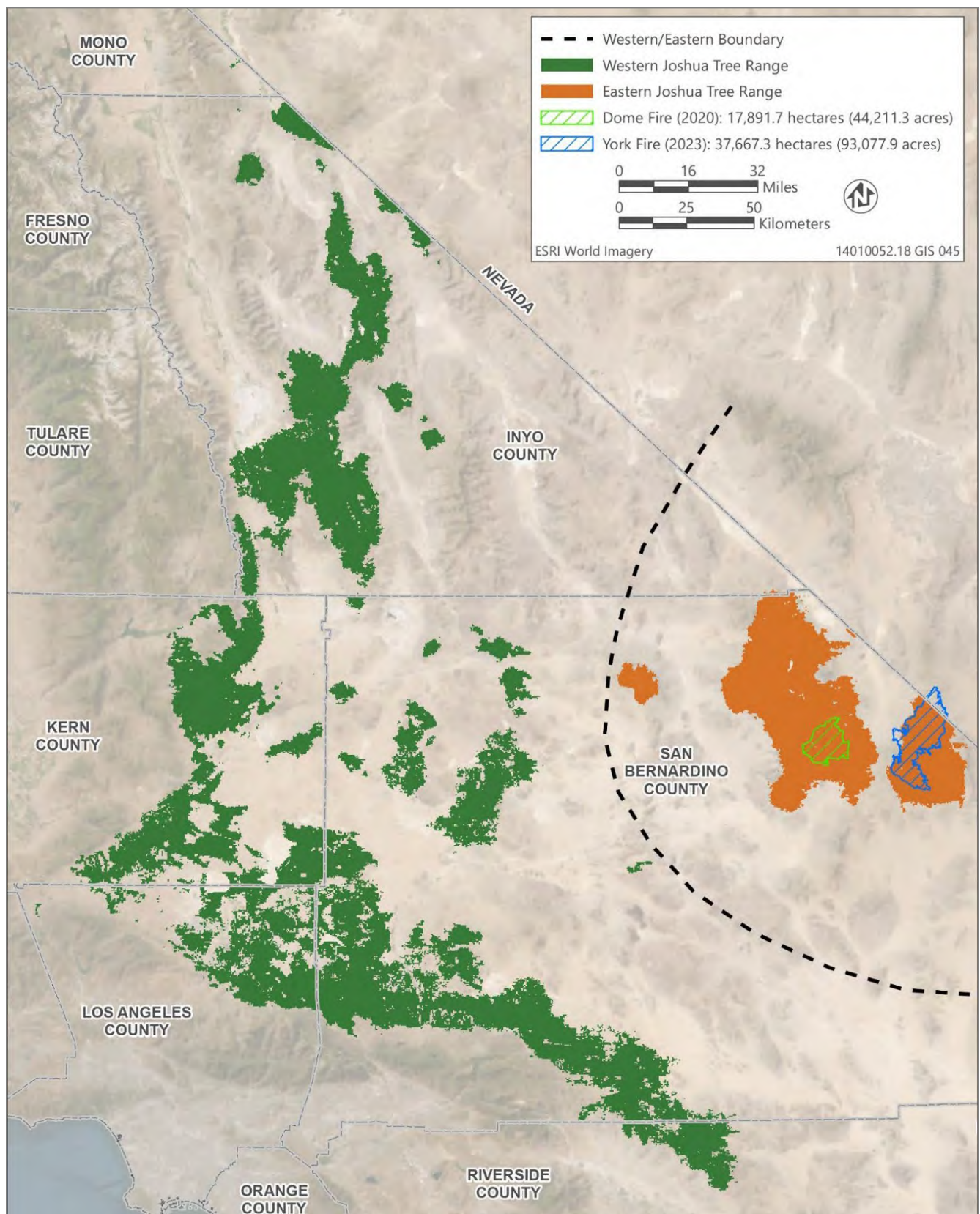
<sup>1</sup> Not included are portions of the range that are classified as water, non-burnable agriculture, non-burnable urban, and sparsely vegetated.

<sup>2</sup> The elevational range of western Joshua tree was divided into four equal range classes: low elevation: 585–1,105.9 meters (1,919–3,628 feet); middle-low elevation: 1,106–1,625.9 meters (3,629–5,334 feet); middle-high elevation: 1,626–2,145.9 meters (5,335–7,040 feet); high elevation: 2,146–2,675.9 meters (7,041–8,780 feet).

Source: Esque et al. 2023; LANDFIRE 2023; compiled by Ascent in 2024.

Most of the western Joshua tree range in California is modeled as moderate to high vegetation departure, which is mostly concentrated within the middle-low and middle-high elevation classes (Table 4-7). In addition, there are high and very high departure categories present with these middle-elevation areas. Although vegetation departure is mainly very low in the lowest elevation class where western Joshua tree is present, there is also a large amount of land within this elevation class that is classified as moderate to high and high vegetation departure. The low elevation class is defined as 585 to 1,105.9 meters (1,919 to 3,628 feet) and therefore still represents mid-elevation areas. This substantial vegetation change is likely at least partially explained by the increase in annual fire area in middle-elevation areas from 1984 to 2013 (Brooks et al. 2018).



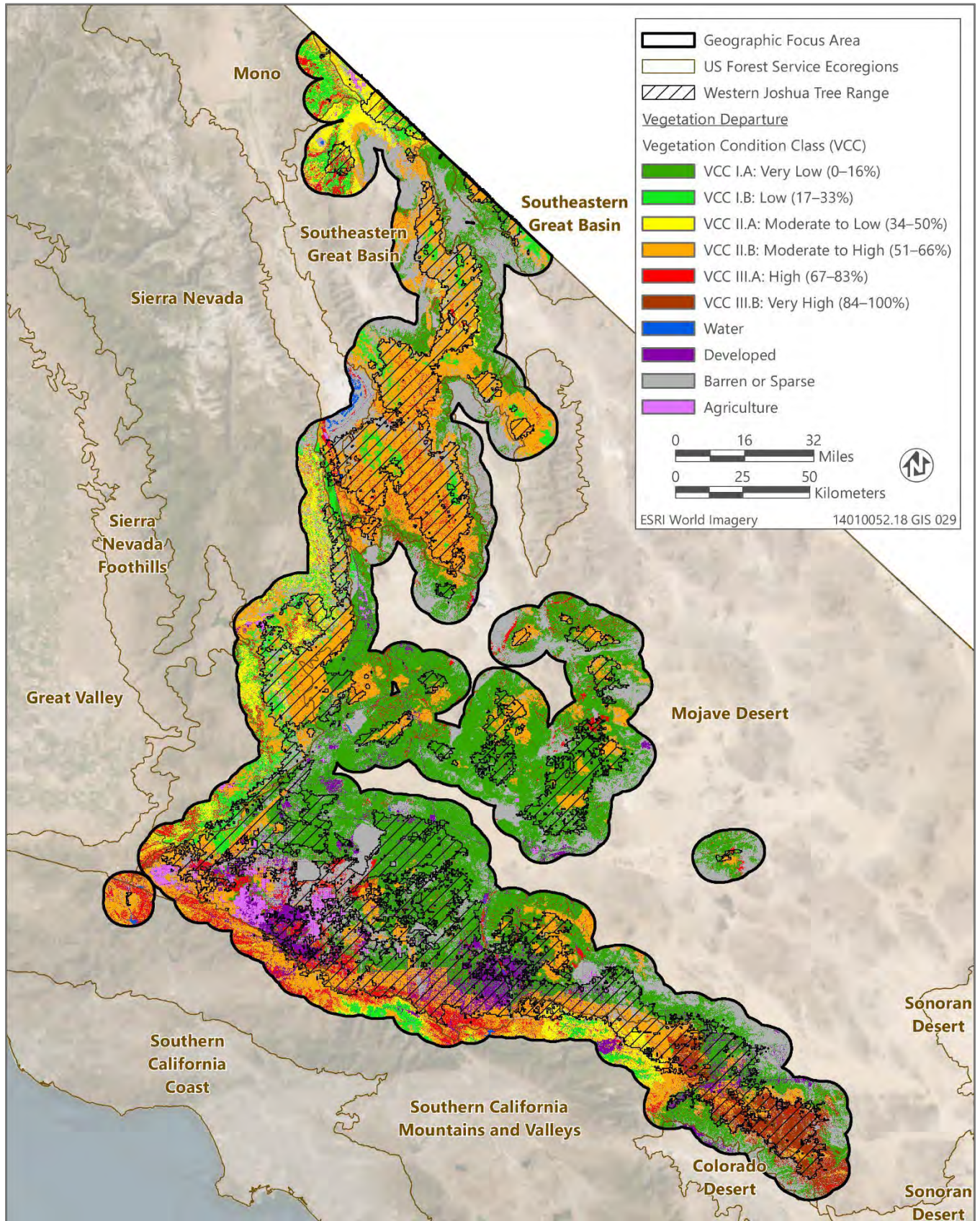


Sources: CAL FIRE 2023; Esque et al. 2023; adapted by Ascent in 2024.

Figure 4-8 Dome and York Fires Overlapping the Eastern Joshua Tree Range in California







Sources: Esque et al. 2023; LANDFIRE 2023; USFS 2024; adapted by Ascent in 2024.

**Figure 4-9 Vegetation Departure within the Geographic Focus Area**



Wildland fire tends to be unevenly distributed in the Mojave Desert with most large and recurring fires located in areas that experience relatively high amounts of summer precipitation (Tagestad et al. 2016). Higher precipitation leads to more plant growth and in turn, more fuel for fire. Because of fuel availability, fires tend to also be more frequent at middle to high elevations (Brooks et al. 2018).

These patterns of wildland fire occurrence could threaten future western Joshua tree population persistence because some middle to high elevation areas of the Mojave Desert have the highest probability of retaining 20th century-suitable climate conditions for western Joshua tree (Shryock et al. 2025), and therefore, fire may disproportionately affect these areas of western Joshua tree climate refugia. The middle-elevation areas, which have experienced recent increases in annual burn area, are where the highest densities of western Joshua trees are usually found (Brooks et al. 2018). The Bridge Fire (2024) burned partially within modeled future climate refugia in the Southern Mountains and Valleys ecoregion near Piñon Hills, California (CAL FIRE 2024; Shryock et al. 2025).

Joshua tree stands can be heavily affected by fire; for example, one study found that 80 percent of the burned western Joshua tree and 26 percent of unburned western Joshua trees died at Joshua Tree National Park approximately 5 years postfire (DeFalco et al. 2010). Burned Joshua tree stands recover slowly following fire, partially because postfire resprouts of young Joshua trees can be heavily targeted by herbivores (DeFalco et al. 2010). One study measured the condition of resprouts 2 years postfire and found that only approximately 49 percent of resprouts were healthy (De Vera 2022). This slow recovery is further exacerbated by the low germination success of Joshua tree seeds; postfire recruitment of new Joshua trees is typically seen only in areas that have not previously burned within the past 40 years (Brooks et al. 2018). In addition, another study in the Dome Fire footprint found eastern Joshua tree to have an approximately 18 percent survival rate 2.5 years postfire (Sweet et al. 2023). Between 1.5 and 2.5 years postfire, approximately 5 percent of surviving eastern Joshua trees died (Sweet et al. 2023), highlighting that even Joshua trees that initially survive a burn still may not survive. However, the postfire mortality rates of eastern Joshua tree and western Joshua tree may be different (Cornett 2022).

### 4.3.4 Invasive Plant Species

Invasive species are plants that are nonnative (i.e., do not naturally occur in an area) to an environment, and once introduced, they establish, quickly reproduce and spread, and cause harm to the environment, economy, or human health (Cal-IPC n.d.-a). Invasive plant species, particularly annual grasses, can rapidly invade Mojave Desert habitats and compete with other plants for light, water, space, and nutrients (Brooks 2000; DeFalco et al. 2003; DeFalco et al. 2007; Blank 2009; Perkins and Hatfield 2014). Western Joshua tree is likely most vulnerable to





competition from invasive plant species in the years immediately following its germination and would become less vulnerable as it gets larger and can better compete for resources. Invasive annual plant species currently indirectly affect all western Joshua trees age classes by providing a fuel source for fire, which increases the fire risk in western Joshua tree habitat.

In the greater Mojave Desert region, within the western Joshua tree range, these invasive plant species include those the California Invasive Plant Council has ranked as “high”—meaning they have severe negative ecological impacts on physical processes, plant and wildlife communities, and vegetation structure and moderate to high rates of dispersal and establishment. The species that are ranked high for exhibiting those impacts in the western Joshua tree range in California include Saharan mustard (*Brassica tournefortii*), red brome (*Bromus rubens*), and cheatgrass (*Bromus tectorum*) (Cal-IPC n.d.-b). In addition, stinknet (*Oncosiphon pilulifer*) is ranked high and has been recognized as an emerging significant threat to Mojave Desert ecosystems that can outcompete native plant species and contribute to increased fire frequency (Cal-IPC 2021). Additional invasive plant species are present in the region that are ranked as “limited,” which are plants defined as having a low to moderate rate of invasiveness and minor ecological impacts on a statewide level or not enough information to justify a higher rating. Plants ranked limited generally tolerate a limited range of environmental conditions and therefore have a limited distribution, but these species may be locally persistent and problematic (Cal-IPC n.d.-b, n.d.-c). Invasive plants ranked limited that are present in the range of western Joshua tree include Russian thistle (*Salsola tragus*), Arabian schismus (*Schismus arabicus*), and common Mediterranean grass (*Schismus barbatus*) (Cal-IPC n.d.-b, n.d.-c). The presence of invasive plant species in the Mojave Desert is most associated with human disturbance and development, including roads, OHV use, livestock grazing, and agriculture (Brooks and Berry 2006). Even within protected areas, such as Joshua Tree National Park, there are few places that do not support invasive annual plant species (Frakes, pers. comm., 2021).



Red brome, an invasive grass species that occurs in the western Joshua tree range.

Source: Robb Hannawacker, National Park Service.

#### 4.3.5 Herbivory and Predation

Western Joshua trees rely on different organisms for reproduction and seed dispersal and provide food and shelter for many other species. Sometimes relationships between western Joshua tree and other organisms that are ordinarily harmless or mutualistic can become



predatory or damaging under certain conditions. For example, although the relationship between scatter-hoarding rodents and Joshua trees can be mutualistic (i.e., both organisms benefit one another), in non-masting years when Joshua trees only produce a small number of seeds, an overabundance of rodents may consume all the seeds, which shifts the relationship to a predatory one (Waitman et al. 2012). In addition, small mammal species sometimes strip the bark from Joshua trees for food, nesting material, and moisture. Small mammals, including black-tailed jackrabbits, white-tailed antelope ground squirrels, Botta's pocket gophers (*Thomomys bottae*), and woodrats (*Neotoma* spp.) sometimes strip the bark from Joshua trees, a behavior that occurs with more frequency during drought periods (Esque et al. 2003; DeFalco et al. 2010; Esque et al. 2015). Bark-stripped trees experience higher rates of mortality compared to unstripped trees, and the amount of damage to the tree correlates to its ability to survive (i.e., more damage results in higher likelihood of mortality) (Esque et al. 2003).



Source: Preston Jordan Jr., National Park Service.

Heacox (pers. comm., 2024) reported that observations of yucca weevil, which can also damage Joshua trees, have been increasing. Yucca weevil larvae build protective cases near the ends of Joshua tree branches, and resulting damage to the meristem has been noted to cause branching in affected plants (Jaeger 1965). Adult yucca weevils have been known to feed on host sap, which is thought to not threaten plant health; however, larvae feeding on yucca plants combined with decaying microorganisms that colonize wounded tissue commonly causes infested plants to collapse and die (UC IPM 2020). Heacox (pers. comm., 2024) observed adult yucca weevils feeding and targeting inflorescences of western Joshua



tree, the effects of which are not well understood. Signs of yucca weevil infestation on western Joshua tree include rotted branches full of grubs, black sticky substances oozing from holes on the stem and leaves, and discoloration of plant parts. In addition, signs of infestation also include yucca weevil presence on multiple trees in a stand and rotting bases of younger western Joshua trees (Heacox, pers. comm., 2024). However, parasitic wasps, which parasitize yucca moth larvae, may mediate the effects of yucca weevil predation on Joshua tree when present, as has been observed in Spanish dagger (*Yucca treculiana*) (Crabb and Pellmyr 2006). Lastly, Joshua trees can also experience infestations of other insects, such as a small, contained outbreak of the yucca plant bug (*Halticotoma valida*), which was reported as negatively affecting several planted Joshua trees at a demonstration garden in the town of Joshua Tree, California (JTNP 2017).

## 4.4 MANAGEMENT UNITS

Conservation management units are defined in the Conservation Plan to organize and prioritize management actions for western Joshua tree based on physical, ecological, and management characteristics. The current and predictable future characteristics of the environment, such as quality of habitat and climate conditions, influence the relative importance and expected effectiveness of specific management actions. Management characteristics are determined by the level of existing protection of western Joshua tree and the entity with authority for land management. Organizing the landscape by its physical, ecological, and management characteristics will help guide the application of the Conservation Plan's management actions.

Climate change is the greatest threat to western Joshua tree, and therefore, climate refugia areas (as shown in Figure 4-4) are critical for long-term western Joshua tree conservation. A buffer around climate refugia provides an area that can absorb impacts from other threats to predicted future climate refugia (e.g., invasive species, wildland fire, development). Unoccupied areas of future suitable habitat are important for natural dispersal and possibly assisted migration. Predictions regarding climate refugia using data and modeling from Shryock et al. (2025) were used to determine climate-related management criteria, and were based on Shared Socioeconomic Pathways (SSP) emissions scenarios (IPCC 2023). These data are preliminary or provisional and are subject to revision. They were provided to CDFW to meet the need for timely science. The data have not received final approval by US Geological Survey and are provided on the condition that neither the US Geological Survey nor the US Government shall be held liable for any damage resulting from the authorized or unauthorized use of the data. The categories delineating current and future climate refugia for the purposes of this Conservation Plan are in areas in which the species can naturally migrate and are as follows:

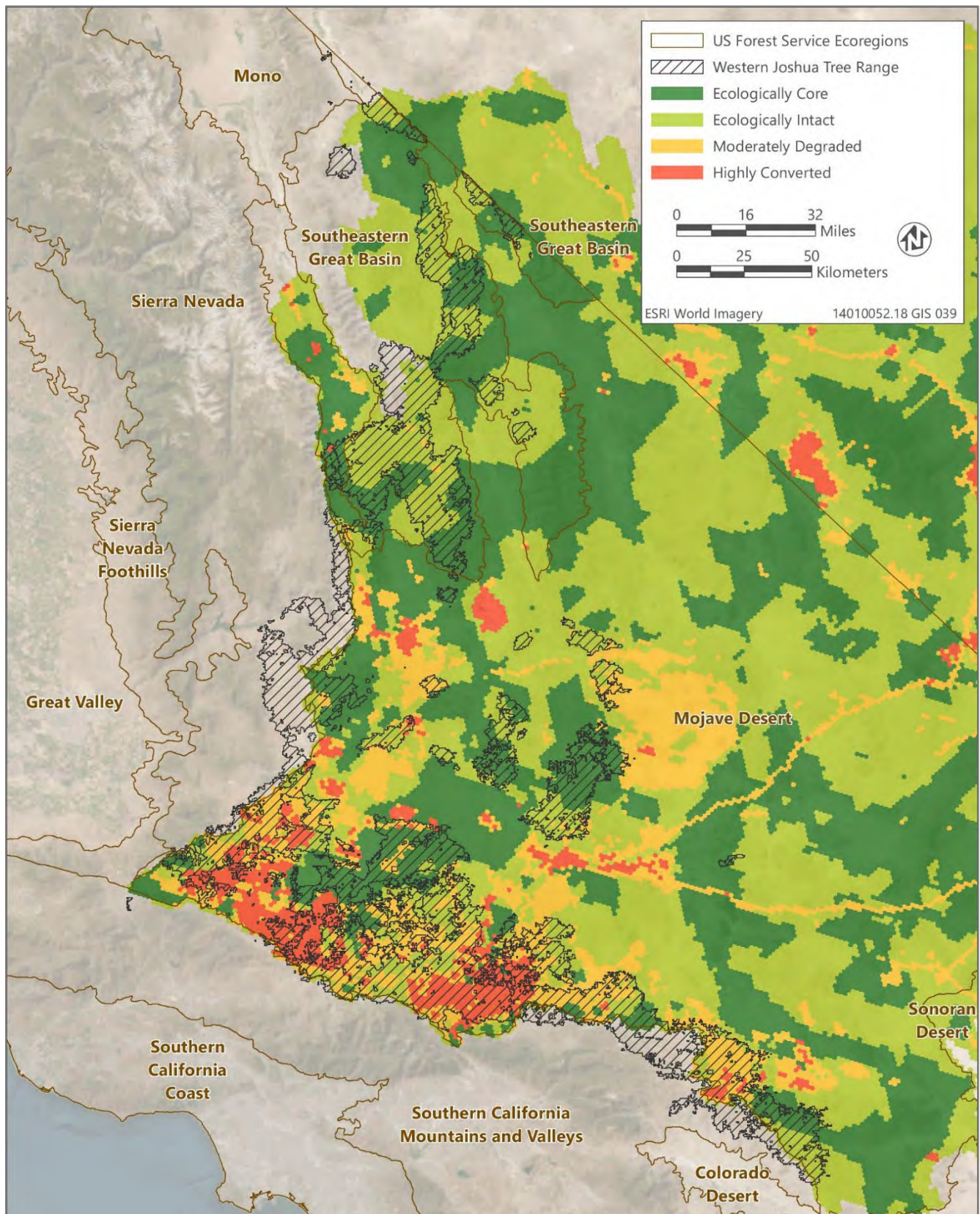




1. **Predicted climate refugia category:** Areas identified within western Joshua tree distribution that are predicted to continue to provide suitable habitat conditions in the future based on low (SSP 2-4.5), moderate (SSP 3-7.0), and high (SSP 5-8.5) emissions climate change modeling scenarios for the 2071 through 2100 timeframe. These three emissions scenarios were selected to ensure that a sufficient area of occupied habitat is targeted for protection to meet the effectiveness criteria for management actions in the Conservation Plan that identify priority conservation lands and restoration and enhancement areas, and assist western Joshua tree migration through connectivity corridors (see Sections 5.2, "Management Actions Necessary to Conserve Western Joshua Tree," and 5.3, "Effectiveness Criteria").
2. **Buffered climate refugia category:** Areas within a 2.5-kilometer (approximately 1.6-mile) buffer of the predicted climate refugia category boundaries for the low, moderate, and high emissions modeling scenarios that overlap currently occupied and unoccupied western Joshua tree habitat. The buffered climate refugia category contains lands that are modeled as climate refugia and lands that are not modeled as climate refugia.
3. **Unoccupied future suitable habitat category:** Areas where western Joshua tree can disperse naturally that are currently unoccupied by western Joshua tree but are predicted to be climate refugia and therefore modeled to provide future suitable habitat based on climate models for the low, moderate, and high emissions modeling scenarios in the 2071 through 2100 timeframe. Unoccupied future suitable habitat does not overlap lands in the buffered climate refugia category.

The Mojave Desert ecological assessment (see Figure 4-10) was conducted to describe and understand the ecological character of the region and assist in identifying areas for protection (Randall et al. 2010). This assessment was developed to help inform planning and management for land use and conservation investment across the region (Randall. et. al. 2010). A majority of the habitat that encompasses the western Joshua tree range in California in the Mojave Desert region was split into the following conservation value categories presented from least to most disturbed: ecologically core, ecologically intact, moderately degraded, and highly converted (see Table 4-8 for category definitions and recommended management strategies) (Randall et al. 2010). This initial assessment of the current ecosystem conditions was updated to include recent areas of solar development (Parker et al. 2018). For the Conservation Plan, additional data for solar and wind development (Hoen et al. 2018; Fujita et al. 2023) were added. This assessment is an important starting point for prioritizing areas that will be most important for western Joshua tree conservation and management. It should be noted that approximately 15.6 percent of the western Joshua tree range in California was not assessed, and therefore conservation value has not been evaluated for these areas. The ecological assessment did not consider climate refugia modeling as a criterion for conservation value and the climate refugia modeling did not consider conservation value when modeling climate refugia.





Sources: Randall et al. 2010; Hoen et al. 2018; Parker et al. 2018; Esque et al. 2023; Fujita et al. 2023; USFS 2024; adapted by Ascent in 2024.

**Figure 4-10 Conservation Value Categories Overlapping the California Range of Western Joshua Tree**





A variety of strategies may be required to conserve western Joshua tree, depending on the general conservation value of habitat (Table 4-8). Strategies include protecting high conservation value (i.e., ecologically core) lands through redesignation of public lands and acquisition or leasing of private and State School Lands, respectively, enhancing the management and restoration of public lands, and promoting adaptive management. Because the initial assessment covered the entire Mojave Desert region based on satellite data, the ecological assessment authors recommend a finer-scale and site-specific assessment for decision-making regarding specific projects or site-scale planning (Randall et al. 2010).

**Table 4-8 Conservation Value Category Definitions and Land Management Strategies for each Category**

| Conservation Value         | Category Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ecologically core</b>   | These lands of highest conservation value are largely undisturbed and unfragmented and support the conservation targets (species, ecological systems, springs, and seeps) selected for this analysis. Their full protection is critical for long-term conservation of biodiversity in the Mojave Desert.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Protect the large, intact habitat blocks comprising ecologically core lands to conserve irreplaceable conservation targets, support the ecological processes they depend upon, and maintain habitat connectivity. Prevent fragmentation of these areas caused by development and roads, and prevent degradation caused by invasions of exotic species, uncharacteristic (frequent) fire regimes, excessive groundwater withdrawals, and other direct and indirect human impacts. |
| <b>Ecologically intact</b> | These lands of high conservation value are largely undisturbed and unfragmented and support conservation targets. They buffer ecologically core lands and require levels of protection that will allow them to remain relatively undisturbed to preserve ecological processes and to provide viable habitat and connectivity for native wildlife, plants, and communities. Most ecologically intact lands are functionally equivalent to ecologically core lands and may contain many of the same conservation targets, including sensitive species. However, they may have been classified as ecologically intact because they support more widespread ecological systems, are at higher risk of degradation, or support conservation targets for which the conservation goals have already been met on ecologically core lands. | Promote land uses and management practices that maintain or improve landscape integrity and protect conservation targets. Promote restoration of habitat connectivity, natural vegetation communities, and ecological processes (e.g., sand transport and water-flow regimes).                                                                                                                                                                                                   |
| <b>Moderately degraded</b> | These lands are fragmented by roads or off-road-vehicle trails or are in close proximity to urban, agricultural, or other developments. They often maintain ecological functionality (e.g., maintain groundwater infiltration and flow, serve as sand sources, provide connectivity) or provide habitat for native species, including the conservation targets selected for this analysis.                                                                                                                                                                                                                                                                                                                                                                                                                                        | Encourage sustainable land uses that minimize impacts to native species and communities and other natural resources, allow protection of sensitive species and isolated high value native ecosystems, and maintain landscape permeability to wildlife movement.                                                                                                                                                                                                                  |



| Conservation Value | Category Definition                                                                                                                                                         | Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Highly converted   | These urban, suburban, and agricultural lands are heavily altered. Whereas some can support important conservation targets, their ecological context is highly compromised. | Encourage clustering of new land uses in areas already converted for human uses and encourage siting of developments selected to minimize impacts to conservation targets and other biological resources. Focus conservation and management efforts within highly converted lands on existing open spaces, riparian habitats, and canyons that support local wildlife, improve air and water quality, recharge and prevent overdrafts of groundwater aquifers, and otherwise improve human quality of life. Promote management of agricultural lands and urban landscapes that supports wildlife. |

Note: Approximately 15.6 percent of the western Joshua tree range was not mapped by Randall et al. 2010 plus the assessment update by Parker et al. (2018).

Source: Randall et al. 2010; compiled by Ascent in 2024.

Federal, state, local, and tribal jurisdictional boundaries; land ownership; and land management authority are also important considerations in determining which management actions are most important to pursue within management units. Because similar types of management actions and written agreements may be implemented for western Joshua tree conservation within different ownerships and management authorities, categories of land use with similar management have been grouped to define the management units as follows:

1. **Wilderness.** Designated BLM, US Forest Service (USFS), and National Park Service (NPS) wilderness areas, and BLM wilderness study areas.
2. **Preservation with Light Recreation/Other Use.** USFS-recommended wilderness areas, non-wilderness NPS land, California State Parks land (except for State Vehicular Recreation Areas [SVRAs]), BLM areas of critical environmental concern, USFS special interest management areas (includes research natural areas and botanical areas), USFS wild and scenic river areas, BLM National Monuments, USFS National Monuments, local county conservation areas (includes wildlife and wildflower sanctuaries), and other protected lands that are managed for conservation (i.e., land trusts and lands with conservation easements).
3. **Defense.** US Department of Defense lands consisting of multiple installations.
4. **Tribal Land.** Lands held in trust by California Native American tribes (rancherias/reservations) or tribal members (individual allotments usually within rancherias/reservations).



5. **Mixed Use.** California SVRAs, BLM recreation management areas, BLM and USFS grazing allotments, NPS grazing permitted land, USFS and BLM lands that are not included in Wilderness or Preservation with Light Recreation/Other Uses, and city-owned infrastructure lands consisting of cemeteries, irrigation districts, water districts, school districts, and community services.
6. **Little or No Protection.** All other lands (including private and State School Lands as well as DRECP development focus areas and variance process lands).

The percent of the current western Joshua tree range within each conservation category and management unit is summarized in Table 4-9.

### 4.4.1 Range-Wide Management Units

Table 4-9 shows the percentage of the western Joshua tree range in California by conservation value category and management unit. The majority of the range in California is in the Little to No Protection unit, followed by Mixed Use and Defense units. Wilderness units constitute another large portion of the western Joshua tree range in California and have more protection than the previous three units due to the management of Wilderness lands, which includes protection of land and preservation of wilderness character. Tribal land contains less than 1 percent of the range in California.

**Table 4-9 Percent of Western Joshua Tree Range in California within Conservation Value Categories by Management Unit**

| Management Unit                              | Ecologically Core | Ecologically Intact | Moderately Degraded | Highly Converted | Not Categorized | Total                    |
|----------------------------------------------|-------------------|---------------------|---------------------|------------------|-----------------|--------------------------|
| Little or No Protection                      | 3.0               | 6.4                 | 14.5                | 9.1              | 2.6             | 35.5                     |
| Mixed Use                                    | 4.4               | 10.1                | 1.9                 | 0.1              | 7.7             | 24.1                     |
| Defense                                      | 10.4              | 5.6                 | 1.3                 | 0.3              | 0               | 17.7                     |
| Wilderness                                   | 3.7               | 6.3                 | <0.1                | 0                | 4.2             | 14.2                     |
| Preservation with Light Recreation/Other Use | 3.4               | 3.0                 | 0.7                 | 0.1              | 1.2             | 8.4                      |
| Tribal Land                                  | 0                 | <0.1                | 0                   | 0                | <0.1            | <0.1                     |
| <b>Total</b>                                 | <b>24.9</b>       | <b>31.5</b>         | <b>18.4</b>         | <b>9.6</b>       | <b>15.6</b>     | <b>99.99<sup>1</sup></b> |

Notes: Totals may not sum exactly due to independent rounding.

<sup>1</sup> Data do not equal total species range due to mapping discrepancies.

Sources: Randall et al. 2010; Hoen et al. 2018; Parker et al. 2018; Esque et al. 2023; Fujita et al. 2023; compiled by Ascent in 2024.



The majority of the ecologically core habitat, which is defined as the least disturbed, is within Defense units. The next largest amount of ecologically core habitat is within the Mixed Use and Wilderness units (Table 4-9). The majority of ecologically intact habitat is within Mixed Use units. Wilderness, Little to No Protection, and Defense units also contain substantial portions of ecologically intact habitat. The majority of moderately degraded habitat is within Little to No Protection units, followed by Mixed Use and Defense units. The majority of the highly converted habitat, which is the category of land that is most disturbed within the region, is within Little to No Protection units.

The portion of the western Joshua tree range in California that was not categorized in the Mojave Desert ecological assessment is mainly within Mixed Use units, followed by Wilderness, Little to No Protection, and Preservation with Light Recreation/Other Use units. Approximately 22.6 percent of the western Joshua tree range in California is within areas that already have land protections in place and are generally being managed with conservation in mind: Wilderness and Preservation with Light Recreation/Other Use.



Source: Jeb Bjerke, California Department of Fish and Wildlife.

#### 4.4.2 Management Units for Climate Refugia

##### PREDICTED CLIMATE REFUGIA CATEGORY

The predicted climate refugia category consists of areas identified within western Joshua tree distribution that are predicted to continue to provide suitable habitat conditions in the future. Shryock et al. (2025) shows that as emissions levels increase causing land within the predicted





climate refugia category to decrease, the proportion of land within the predicted climate refugia category at lower elevations decreases. The predicted climate refugia category for the low emissions modeling scenario makes up approximately 23.4 percent of the western Joshua tree range in California, whereas the predicted climate refugia category for the moderate and high emissions modeling scenarios make up approximately 15.7 and 8.7 percent of the western Joshua tree range in California, respectively. Most of the land within the predicted climate refugia category for the low emissions modeling scenario is within the middle-low elevation (1,106–1,625.9 meters [3,629–5,334 feet]) and middle-high elevation (1,626–2,145.9 meters [5,335–7,040 feet]) classes, constituting approximately 44.7 percent and 43.4 percent of the predicted climate refugia category for the low emissions modeling scenario, respectively. Comparatively, only approximately 4.5 percent of the predicted climate refugia category for the low emissions modeling scenario is within the high elevation class (2,146–2,675.9 meters [7,041–8,780 feet]).

Predicted climate refugia for the moderate emissions modeling scenario are predominantly within the middle-low and middle-high elevations classes as well, constituting approximately 39 and 51.5 percent, respectively, of the predicted climate refugia category for the moderate emissions modeling scenario, although a larger proportion is present within the middle-high elevation class compared to the low emissions modeling scenario. In addition, approximately 6 percent of the predicted climate refugia for the moderate emissions modeling scenario is within the high elevation class, which is an increase in percentage from the low emissions modeling scenario.

Predicted climate refugia for the high emissions modeling scenario is predominantly within the middle-low and middle-high elevations classes as well, constituting approximately 29.4 percent and 61.8 percent of the predicted climate refugia category for the high emissions scenario, respectively, although a larger proportion is present within the middle-high elevation class compared to the moderate emissions modeling scenario. Lastly, approximately 8.7 percent of the predicted climate refugia for the high emissions modeling scenario is within the high elevation class, which is an increase from the moderate emissions modeling scenario.

Over half of the land within the predicted climate refugia category for the low emissions modeling scenario is within the Southeastern Great Basin ecoregion in the northern portion of the species' range in California; approximately 26.5 percent is in the Mojave Desert ecoregion; 14.4 percent is in the Southern California Mountains and Valleys ecoregion; and 2.0 percent is within the Sierra Nevada ecoregion. Comparatively, approximately 24.4 percent of the current western Joshua tree range in California is within the Southeastern Great Basin ecoregion; 59.9 percent is within Mojave Desert ecoregion; 6.9 percent is within Southern California Mountains and Valleys ecoregion; 8.7 percent is within Sierra Nevada ecoregion; and less than 1 percent is within both the Mono ecoregion and Sierra Nevada Foothills ecoregion (Table 4-1, Section



4.1.1). For land within the predicted climate refugia category for the moderate emissions modeling scenario, almost 60 percent is within Southeastern Great Basin ecoregion and approximately 23.7 percent is in the Mojave Desert ecoregion; 16.6 percent is in the Southern California Mountains and Valleys ecoregion; and only 0.6 percent is within the Sierra Nevada ecoregion. Lastly, for land within the predicted climate refugia category for the high emissions modeling scenario, approximately 64 percent is within Southeastern Great Basin ecoregion, 18.5 percent in the Southern California Mountains and Valleys ecoregion and 17.5 percent is in the Mojave Desert ecoregion.

Table 4-10 outlines the percentage of land within the predicted climate refugia category for the low, moderate, and high emissions modeling scenarios within each conservation value category and management unit. Overall, most of the land within the predicted climate refugia category for all three emission modeling scenarios is in Mixed Use management units, followed by Wilderness units, then Little to No Protection units. For the low and moderate emissions modeling scenarios, Defense units constitute the next largest proportion of land within the predicted climate refugia category; although for the highest emissions modeling scenario, Preservation with Light Recreation/Other Use units comprise a larger proportion of land than Defense units. These data show that as emissions increase and land within the predicted climate refugia category decreases, Defense units would eventually contain less of the land within the predicted climate refugia category and Preservation with Light Recreation/Other Use units would contain more. Tribal Land units do not contain land in the predicted climate refugia category in any of the three emission modeling scenarios.

**Table 4-10 Percent of Predicted Climate Refugia (Low, Moderate, and High Emissions Modeling Scenarios) Overlapping Conservation Value Categories and Management Units**

| Management Units | Climate Modeling Scenarios | Ecologically Core | Ecologically Intact | Moderately Degraded | Highly Converted | Not Categorized | Total |
|------------------|----------------------------|-------------------|---------------------|---------------------|------------------|-----------------|-------|
| Mixed Use        | Low Emissions              | 2.2               | 16.0                | 0.5                 | <0.1             | 9.9             | 28.6  |
|                  | Moderate Emissions         | 1.6               | 15.9                | 0.3                 | <0.1             | 11.2            | 29.1  |
|                  | High Emissions             | 1.7               | 18.3                | 0.4                 | <0.1             | 16.8            | 37.2  |
| Wilderness       | Low Emissions              | 8.2               | 14.6                | <0.1                | 0                | 5.3             | 28.2  |
|                  | Moderate Emissions         | 8.9               | 14.3                | <0.1                | 0                | 5.8             | 29.0  |
|                  | High Emissions             | 10.0              | 14.6                | 0                   | 0                | 6.1             | 30.7  |



| Management Units                             | Climate Modeling Scenarios | Ecologically Core | Ecologically Intact | Moderately Degraded | Highly Converted | Not Categorized | Total |
|----------------------------------------------|----------------------------|-------------------|---------------------|---------------------|------------------|-----------------|-------|
| Little or No Protection                      | Low Emissions              | 0.7               | 3.9                 | 5.7                 | 9.6              | 1.8             | 21.7  |
|                                              | Moderate Emissions         | 0.6               | 3.4                 | 4.0                 | 9.7              | 2.0             | 19.7  |
|                                              | High Emissions             | 0.2               | 2.2                 | 2.3                 | 6.2              | 1.9             | 12.9  |
| Defense                                      | Low Emissions              | 5.2               | 8.1                 | <0.1                | 0                | 0               | 13.3  |
|                                              | Moderate Emissions         | 4.3               | 9.1                 | <0.1                | 0                | 0               | 13.4  |
|                                              | High Emissions             | 2.4               | 6.9                 | 0                   | 0                | 0               | 9.4   |
| Preservation with Light Recreation/Other Use | Low Emissions              | 3.2               | 1.9                 | 0.2                 | 0.1              | 2.9             | 8.2   |
|                                              | Moderate Emissions         | 3.3               | 1.7                 | 0.1                 | 0.1              | 3.6             | 8.8   |
|                                              | High Emissions             | 3.8               | 1.8                 | <0.1                | 0.1              | 4.1             | 9.9   |
| Tribal Land                                  | Low Emissions              | 0                 | 0                   | 0                   | 0                | 0               | 0     |
|                                              | Moderate Emissions         | 0                 | 0                   | 0                   | 0                | 0               | 0     |
|                                              | High Emissions             | 0                 | 0                   | 0                   | 0                | 0               | 0     |
| Total                                        | Low Emissions              | 19.5              | 44.5                | 6.4                 | 9.6              | 19.9            | 100.0 |
|                                              | Moderate Emissions         | 18.8              | 44.4                | 4.5                 | 9.8              | 22.6            | 100.0 |
|                                              | High Emissions             | 18.2              | 43.9                | 2.7                 | 6.3              | 28.9            | 100.0 |

Notes: Totals may not sum exactly due to independent rounding.

Sources: Randall et al. 2010; Hoen et al. 2018; Parker et al. 2018; Esque et al. 2023; Fujita et al. 2023; Shryock et al. 2025; compiled by Ascent in 2024 and 2025.

Most of the land within the predicted climate refugia category for low, moderate, and high emissions modeling scenarios is within ecologically intact habitat areas, with lesser amounts within uncategorized areas and ecologically core habitat areas, and the least in highly converted habitat areas (Table 4-10). Although this pattern is similar for all three emission modeling scenarios across the conservation categories, there is some variation in the relative amount of land in each of the emissions modeling scenarios within the conservation categories. For instance, as emissions increase and land within the predicted climate refugia category decreases, a larger portion of the predicted climate refugia category is modeled



within uncategorized areas. Conversely, the proportion of land within ecologically core and ecologically intact areas decreases slightly as emissions rise.

The majority of the ecologically core habitat in the predicted climate refugia category for all emissions modeling scenarios is within Wilderness units. The next largest amount of ecologically core habitat is within Defense units for low and moderate emissions modeling scenarios, then in Preservation with Light Recreation/Other Use units in the high emissions modeling scenario. The majority of ecologically intact habitat in the predicted climate refugia category for all emissions modeling scenarios is within Mixed Use units, followed by, in descending order, Wilderness, Defense, and Little to No Protection units. The majority of moderately degraded habitat in the predicted climate refugia category for low, moderate, and high emissions modeling scenarios is within Little to No Protection units, followed by Mixed Use units, then Preservation with Light Recreation/Other Use units. For all three emission modeling scenarios, most of the highly converted habitat in the predicted climate refugia category is within Little to No Protection units. Lastly, for all three emission modeling scenarios, the portion of land within the predicted climate refugia category that is within areas that were not categorized in the Mojave Desert ecological assessment is mainly within Mixed Use units, followed by Wilderness, Preservation with Light Recreation/Other Use, and Little to No Protection units.

Portions of land within the predicted climate refugia category for all three emission modeling scenarios are present within areas that already have land protections in place and are generally being managed with conservation in mind (i.e., Wilderness and Preservation with Light Recreation/Other Use units); however, modeling data show that as emissions increase and land within the predicted climate refugia category decreases, a smaller proportion of the predicted climate refugia category will be within these areas. For the low emissions modeling scenario, approximately 36.4 percent of the predicted climate refugia category is within these areas. This constitutes approximately 8.5 percent of the western Joshua tree range in California for the low emissions modeling scenario. In addition, approximately 37.8 percent of the predicted climate refugia category for the moderate emissions modeling scenario and approximately 40.5 percent of the predicted climate refugia category for the high emissions modeling scenario are within areas that already have land protections in place. These areas constitute approximately 5.9 percent of the western Joshua tree range in California for the moderate emissions modeling scenario and only 3.5 percent of the western Joshua tree range in California for the high emissions modeling scenario.





## BUFFERED CLIMATE REFUGIA CATEGORY

The buffered climate refugia category is a 2.5-kilometer (approximately 1.6-mile) buffer around the predicted climate refugia category. Almost 60 percent of the buffered climate refugia category is occupied by western Joshua tree, and approximately 41 percent is not occupied by western Joshua tree. The buffered climate refugia category constitutes 22.6 percent of western Joshua tree's California range. Most of the buffered climate refugia category is within the middle-low elevation (1,106–1,625.9 meters [3,629–5,334 feet]), middle-high elevation (1,626–2,145.9 meters [5,335–7,040 feet]), and low elevation (585–1,105.9 meters [1,919–3,628 feet]) classes, constituting 54.8 percent, 22.6 percent, and 18.2 percent of the buffered climate refugia category, respectively. Unlike the predicted climate refugia category, the buffered climate refugia category is present within a very high elevation class (greater than 2,675.9 meters [greater than 8,780 feet]), constituting approximately 0.1 percent of the buffered climate refugia category. In addition, 42.5 percent of the buffered climate refugia category is within the Southeastern Great Basin ecoregion in the northern portion of the species' range in California, 27.5 percent is in the Mojave Desert ecoregion, 17.6 percent in the Southern California Mountains and Valleys ecoregion, and 12.4 percent is within the Sierra Nevada ecoregion.

Table 4-11 outlines the percentage of buffered climate refugia category within and outside of the western Joshua tree range in California by conservation value category and management unit. The majority of the buffered climate refugia category is in Wilderness units, followed by Mixed Use, Little to No Protection, then Preservation with Light Recreation/Other Use units. Tribal Land units contain a minimal amount of land within the buffered climate refugia category in ecologically intact habitat within the species' California range and uncategorized areas within and outside the species' California range.

**Table 4-11 Percent of Buffered Climate Refugia Category Overlapping Conservation Value Categories and Management Units**

| Management Units | Presence of Western Joshua Tree Range | Ecologically Core | Ecologically Intact | Moderately Degraded | Highly Converted | Not Categorized | Total       |
|------------------|---------------------------------------|-------------------|---------------------|---------------------|------------------|-----------------|-------------|
| Wilderness       | Occupied                              | 3.7               | 6.6                 | <0.1                | 0                | 3.3             | 13.6        |
|                  | Unoccupied                            | 5.5               | 10.5                | <0.1                | 0                | 2.5             | 18.4        |
|                  | <b>Total</b>                          | <b>9.2</b>        | <b>17.0</b>         | <b>&lt;0.1</b>      | <b>0</b>         | <b>5.8</b>      | <b>32.0</b> |
| Mixed Use        | Occupied                              | 2.5               | 5.1                 | 0.6                 | 0.1              | 8.0             | 16.2        |
|                  | Unoccupied                            | 1.4               | 2.4                 | 0.4                 | 0.2              | 5.9             | 10.3        |
|                  | <b>Total</b>                          | <b>3.9</b>        | <b>7.5</b>          | <b>1.0</b>          | <b>0.2</b>       | <b>13.9</b>     | <b>26.5</b> |



| Management Units                             | Presence of Western Joshua Tree Range | Ecologically Core | Ecologically Intact | Moderately Degraded | Highly Converted | Not Categorized | Total        |
|----------------------------------------------|---------------------------------------|-------------------|---------------------|---------------------|------------------|-----------------|--------------|
| Little or No Protection                      | Occupied                              | 0.9               | 3.1                 | 6.7                 | 4.5              | 2.1             | 17.3         |
|                                              | Unoccupied                            | 0.3               | 0.7                 | 0.9                 | 1.0              | 1.5             | 4.4          |
|                                              | <b>Total</b>                          | <b>1.2</b>        | <b>3.9</b>          | <b>7.6</b>          | <b>5.4</b>       | <b>3.7</b>      | <b>21.7</b>  |
| Preservation with Light Recreation/Other Use | Occupied                              | 1.0               | 1.9                 | 0.5                 | <0.1             | 1.0             | 4.4          |
|                                              | Unoccupied                            | 0.7               | 1.1                 | 0.1                 | <0.1             | 3.7             | 5.7          |
|                                              | <b>Total</b>                          | <b>1.7</b>        | <b>3.0</b>          | <b>0.7</b>          | <b>0.1</b>       | <b>4.7</b>      | <b>10.1</b>  |
| Defense                                      | Occupied                              | 4.3               | 3.2                 | <0.1                | 0                | 0               | 7.5          |
|                                              | Unoccupied                            | 1.4               | 0.7                 | <0.1                | 0                | 0               | 2.1          |
|                                              | <b>Total</b>                          | <b>5.6</b>        | <b>3.9</b>          | <b>&lt;0.1</b>      | <b>0</b>         | <b>0</b>        | <b>9.6</b>   |
| Tribal Land                                  | Occupied                              | 0                 | 0.1                 | 0                   | 0                | <0.1            | 0.1          |
|                                              | Unoccupied                            | 0                 | 0                   | 0                   | 0                | <0.1            | <0.1         |
|                                              | <b>Total</b>                          | <b>0</b>          | <b>0.1</b>          | <b>0</b>            | <b>0</b>         | <b>&lt;0.1</b>  | <b>0.1</b>   |
| <b>Total</b>                                 | Occupied                              | 12.3              | 19.9                | 7.8                 | 4.6              | 14.4            | 59.1         |
|                                              | Unoccupied                            | 9.3               | 15.4                | 1.4                 | 1.2              | 13.6            | 40.9         |
|                                              | <b>Total</b>                          | <b>21.6</b>       | <b>35.3</b>         | <b>9.3</b>          | <b>5.7</b>       | <b>28.1</b>     | <b>100.0</b> |

Notes: Totals may not sum exactly due to independent rounding.

Sources: Randall et al. 2010; Hoen et al. 2018; Parker et al. 2018; Esque et al. 2023; Fujita et al. 2023; Shryock et al. 2025; compiled by Ascent in 2025.

Most of the buffered climate refugia category is within the ecologically intact habitat areas, followed by areas that are not categorized, ecologically core habitat, and moderately degraded habitat. The majority of the ecologically core habitat in the buffered climate refugia category is within Wilderness units. The next largest amount of ecologically core habitat is within the Defense units and then Mixed Use units. The majority of ecologically intact habitat in the buffered climate refugia category is also within Wilderness units. The next largest amount of ecologically intact habitat is within Mixed Use, then Defense and Little to No Protection units. The majority of moderately degraded habitat and highly converted habitat in the buffered climate refugia category is within Little to No Protection units.

Approximately 42.1 percent of the buffered climate refugia category is within areas that already have land protections in place and are generally being managed with conservation in mind: Wilderness and Preservation with Light Recreation/Other Use units. The portion of land within the buffered climate refugia category that was not categorized in the Mojave Desert ecological assessment is mainly within Mixed Use units, then Wilderness, Preservation with Light Recreation/Other Use, and Little to No Protection units.





Source: Jeb Bjerke, California Department of Fish and Wildlife.

## UNOCCUPIED FUTURE SUITABLE HABITAT CATEGORY

Most of the unoccupied future suitable habitat category, areas that are predicted to provide future suitable habitat based on climate modeling for the low, moderate, and high emissions modeling scenarios, are predominantly within the middle-high elevation (1,626–2,145.9 meters [5,335–7,040 feet]) and middle-low elevation (1,106–1,625.9 meters [3,629–5,334 feet]) classes, constituting 71.1 percent and 21.7 percent of the unoccupied future suitable habitat category, respectively. In addition, over 75 percent of the unoccupied future suitable habitat category is within the Southeastern Great Basin ecoregion in the northern portion of the species' range in California; 14.2 percent is within the Sierra Nevada ecoregion, 6.2 percent in the Mojave Desert ecoregion; and 3.8 percent is within the Southern California Mountains and Valleys ecoregion.

Table 4-12 outlines the percentage of unoccupied future suitable habitat category by conservation value category and management unit. The majority of the unoccupied future suitable habitat category is within Wilderness units, followed by Mixed Use, Preservation with Light Recreation/Other Use, and then Little to No Protection units. Tribal Land units do not contain land in the unoccupied future suitable habitat category.



**Table 4-12 Percent of Unoccupied Future Suitable Habitat Category Overlapping Conservation Value Categories and Management Units**

| Management Units                              | Ecologically Core | Ecologically Intact | Moderately Degraded | Highly Converted | Not Categorized | Total        |
|-----------------------------------------------|-------------------|---------------------|---------------------|------------------|-----------------|--------------|
| Wilderness                                    | 32.2              | 10.2                | 0                   | 0                | 27.3            | 69.7         |
| Mixed Use                                     | 0.4               | 3.8                 | 4.4                 | 0                | 13.8            | 22.3         |
| Preservation with Light Recreation/ Other Use | 2.9               | 0.4                 | 0                   | 0                | 1.8             | 5.0          |
| Little or No Protection                       | <0.1              | 0.6                 | <0.1                | <0.1             | 2.3             | 3.0          |
| Defense                                       | 0                 | <0.1                | 0                   | 0                | 0               | <0.1         |
| Tribal Land                                   | 0                 | 0                   | 0                   | 0                | 0               | 0            |
| <b>Total</b>                                  | <b>35.5</b>       | <b>15.0</b>         | <b>4.4</b>          | <b>&lt;0.1</b>   | <b>45.1</b>     | <b>100.0</b> |

Notes: Totals may not sum exactly due to independent rounding.

Sources: Randall et al. 2010; Hoen et al. 2018; Parker et al. 2018; Esque et al. 2023; Fujita et al. 2023; Shryock et al. 2025; compiled by Ascent in 2024.

Most of the unoccupied future suitable habitat category is within areas not categorized by the Mojave Desert ecological assessment. In addition, there is a minimal amount of land within the unoccupied future suitable habitat category in the highly converted areas. The majority of the ecologically core habitat in unoccupied future suitable habitat category is within Wilderness units. The next largest amount of ecologically core habitat is within the Preservation with Light Recreation/Other Use units and then Mixed Use units (Table 4-12). Most of ecologically intact habitat within the unoccupied future suitable habitat category is also within Wilderness units. The next largest amount of ecologically intact habitat is within Mixed Use, Little to No Protection, followed by Preservation with Light Recreation/ Other Use units. The majority of moderately degraded habitat is within Mixed Use units. The only highly converted habitat in the unoccupied future suitable habitat category is within Little to No Protection units.

Approximately 74.7 percent of the unoccupied future suitable habitat category is within areas that already have land protections in place and are generally being managed with conservation in mind: Wilderness and Preservation with Light Recreation/Other Use units. The portion of unoccupied future suitable habitat category that was not categorized in the Mojave Desert ecological assessment is mainly within Wilderness units, followed by Mixed Use, Little or No Protection, then Preservation with Light Recreation/Other Use units.







## 5 CONSERVATION MANAGEMENT ACTIONS AND EFFECTIVENESS CRITERIA

Management actions necessary to conserve western Joshua tree and objective, measurable criteria to assess the effectiveness of such actions are the heart of the Conservation Plan. This chapter describes the breadth of actions that are likely to be necessary to conserve western Joshua tree and provides a conceptual framework for how to use these actions to achieve the vision, purpose, and objectives of the Conservation Plan described in Chapter 1, "Introduction."

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*"Wilderness is not a luxury but a necessity of the human spirit."*  
— Edward Abbey

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The management actions are guidelines for conservation and the criteria help define the effectiveness of the actions; they do not create new statutory or regulatory mandates. Nevertheless, the management actions in this chapter can be used in several ways. They can be voluntarily adopted and implemented by project proponents, land managers, and philanthropists to help the species or to prevent the species from being harmed. California Native American tribes (Tribes) and the State can work together to co-manage conservation consistent with the Conservation Plan's guidance. The management actions can also be incorporated into project approvals by local governments and regulatory agencies that authorize projects in western Joshua tree's range in California. Researchers can implement management actions related to research, and private citizens and other organizations can implement actions related to education and awareness. Western Joshua tree conservation will require action from many different people and organizations.



Section 5.1 introduces the sources of information behind western Joshua tree conservation. Section 5.2 includes descriptions of management actions in five categories:

- Impact avoidance and minimization,
- Land conservation and management,
- Tribal co-management,
- Research to inform long-term conservation, and
- Education and awareness.

Section 5.3 provides objective, measurable criteria to assess the effectiveness of management actions, the Conservation Plan, and the Western Joshua Tree Conservation Fund (Conservation Fund) for conservation of western Joshua tree in California. Section 5.4 is intended to guide which management actions may be most impactful for conservation in specific western Joshua tree management units.

## 5.1 SCIENCE INCLUDING TRADITIONAL ECOLOGICAL KNOWLEDGE TO INFORM MANAGEMENT ACTIONS

The Conservation Plan is informed by science including Traditional Ecological Knowledge (TEK). Integration of TEK with other sources of science has been shown to lead to more sustainable, productive, and locally accepted natural resource management systems worldwide (Bussey et al. 2016). Please refer to Chapter 3, “Traditional Values and Uses of Western Joshua Tree by California Native American Tribes,” for a description of California Native American uses, values, and TEK related to western Joshua tree. Refer to Section 5.2.3, below, for management actions facilitating co-equal collaboration between the State and Tribes.

The critical role of science supporting effective management and conservation of the species is reflected in the seven-step approach to conservation in the face of climate change described by Smith et al. (2023), as summarized below.

1. **Identify genetic structure and distinct populations.** The first step toward conservation is identifying genetic structure and distinct populations. Genomic (i.e., study of genes) tools can provide accurate estimates regarding populations, such as effective population size, demographic history, and population structure, which are all important for successful conservation efforts (Hohenlohe et al. 2021). Genetic data of populations can be used to identify distinct populations, as well as genes that may be responsible for adaptation to changing environments, highlighting populations that may require different management strategies (Hohenlohe et al. 2021). As discussed in Section 4.1.1, “Range and Distribution,” recent research suggests that western Joshua tree populations have significant genetic differences (Smith et al. 2021) that have the potential to respond



differently to climate change (Smith et al. 2023). Population genetic data can also assist in identifying populations with high genetic diversity, which can translate to greater potential for adapting to environmental change (Smith et al. 2023).

2. **Develop species distribution models and identify climate refugia.** Developing species distribution and demographic models for distinct populations using high-quality data that document where western Joshua trees occur (i.e., occurrence data) is important for accurately identifying climate refugia that should be given high priority for protection. These models are imperative for successful species conservation (Morelli et al. 2016; Morelli et al. 2020) and will help determine the degree that climate change poses a threat to a species (Jones et al. 2016). The several species distribution models that have been developed for Joshua tree resulted in very different predictions of suitable habitat distribution by the end of the 21st century (Smith et al. 2023). The wide range of results from these models is a byproduct of different methods used and differences in input data (Smith et al. 2023). For species distribution models to be reliable, accurate occurrence data must be used, then multiple independent data sources must be used to validate models (Sweet et al. 2019). Incorporating physiological (i.e., how plants function) data can also improve the accuracy of species distribution models (Buckley et al. 2010; Evans et al. 2015). Species distribution models can help predict areas of future habitat for a species; however, these models need to include realistic estimates of the species' ability to disperse and access new areas (Bateman et al. 2013). Species distribution models may improve their ability to predict future species distributions under climate change, by incorporating the adaptive potential of populations (Bush et al. 2016; Razgour et al. 2019). Models should focus on fine scale distribution as genetic information becomes available and distinct populations are identified since they may require different management strategies (Hohenlohe et al. 2021).

An important step toward developing accurate range-wide species distribution and climate refugia models for western Joshua tree has been completed with new species distribution data recently published by Esque et al. (2023). These models used remote sensing and ground-validation methodologies to document western Joshua tree presence and absence throughout the species range. This unprecedented dataset has been used to develop climate refugia models that include identification of possible future habitat that is within dispersal range of its current distribution, but that is not currently populated by western Joshua tree (Shryock et al. 2025). These data informed management unit delineation in Section 4.4, "Management Units," land conservation and management actions in Section 5.2.2 (below), and management unit recommendations in Section 5.4 (below).



3. **Validate potential refugia.** Once refugia models have been developed, the next step is to validate the models using demographic data to assess population growth or decline and other data sources to confirm that the potential refugia will be viable in the long term (Sweet et al. 2019). Demographic data can have considerable influence on predicted future species distributions and in validating predicted climate refugia (Merow et al. 2014). Spatial patterns of recruitment can also be used as a predictor of potential climate refugia, which could be compared to predictions based on climate models (Barrows et al. 2020a, 2020b). In addition, incorporating information on the adaptive potential of populations into species distribution models may improve model accuracy for future distribution predictions under climate change (Bush et al. 2016; Razgour et al. 2019).

4. **Assess adaptive genetic variation.** After genetic structure and distinct populations have been identified, the next step is to assess adaptive genetic variation within populations using either association genetics (i.e., identification of genes or genetic markers with underlying important traits) or ideally, experimental approaches coupled with genomic data (Smith et al. 2023). Conservation genetics should focus on the protection of adaptive genetic variation to help manage species that are dealing with climate change (Razgour et al. 2019). Adaptive genetic variation directly affects a species' ability to respond to environmental factors, such as heat stress and drought,



Source: Jeb Bjerke, California Department of Fish and Wildlife.

highlighting the importance of conserving adaptive genetic variation and not just overall genetic variation (Smith et al. 2023). Landscape genomics (i.e., study of how genetic variation is distributed between populations across a species range) and association genetics can identify genes or genetic markers that are likely the basis for local adaptation to climate variation in current populations (Lotterhos and Whitlock 2015).

Genome-wide association studies looking at seedling survival, growth, and specific ecophysiological traits (i.e., physiological processes crucial for interacting with the environment, including gas exchange and water regime) can potentially identify genes underlying climate adaptation (Smith et al. 2023), which can be used to predict these traits in natural populations (Swarts et al. 2017). Studies in common gardens are





particularly important because they can be used to validate the adaptive value of identified genes or genetic markers and reveal underlying physiological mechanisms (Weigel and Nordborg 2015). Common garden experiments are indoor or outdoor plantings of species or populations collected from multiple distinct geographic locations, grown together under shared conditions (Schwinning et al. 2022).

Current common garden research within the US Geological Survey's Mojave Desert Common Gardens network uses Joshua tree seedlings from different locations that are planted outside in various climates throughout the Mojave Desert and in the lab. This research can help determine the extent to which different populations of Joshua tree are adapted to certain local climate conditions and identify the physiological mechanisms by which Joshua trees tolerate drought and heat stress (Smith et al. 2023). Another effort to identify Joshua tree genes and genetic markers associated with specific climate variables is supported by Revive and Restore, a leading wildlife conservation nonprofit organization, to sequence the whole genome from individual Joshua trees sampled across the range of climates in which the species occurs (Smith et al. 2023).

Once climate-associated genes or genetic markers have been identified, the next step will be genotyping (i.e., analyzing genome sequence data) wild populations of Joshua tree to predict long-term potential of adaptation to warming climates (Smith et al. 2023). Populations identified to have the highest probability of adaptation and survival should be prioritized for conservation (Smith et al. 2023).

5. **Identify high priority areas for protection.** Informed by the results of the four steps described above, the next step will be to identify locations within each population that should have the highest priority for protection (Morelli et al. 2020). Determining whether there are any areas slated for development that contain climate refugia and then taking steps to try to protect these areas will be important (Smith et al. 2023). A Mojave Desert ecoregional assessment (Randall et al. 2010; Parker et al. 2018), which identified conservation value for a large portion of the western Joshua tree range, can also be used to help prioritize conservation lands. Even areas that have been identified as highly degraded may still have conservation value if potential refugia is present (Smith et al. 2023). In addition, some areas that have been identified as ecologically intact may experience severe damage due to climate change and, therefore, may have little long-term conservation value (Smith et al. 2023).

Identification of high priority areas for protection to further the conservation of western Joshua tree will be completed as needed by CDFW and partners and will be supported by information produced by the research and tribal communities. While it would be ideal to complete steps 1 through 4 before prioritizing areas for protection, CDFW must



begin work to conserve western Joshua tree immediately and must therefore begin initial prioritization of areas for protection based on the best, currently available information. As additional information generated from steps 1 through 4 becomes available, CDFW will incorporate it into decision making and future updates of the Conservation Plan.

An initial land-prioritization scheme guided by Smith et al. (2023) has been developed by CDFW (described in Section 5.2.2) to help identify high priority areas for protection.

6. **Protect priority areas while accommodating compatible existing and emerging land uses.** Informed by the results of step 5, high priority areas should be protected while accommodating existing and emerging land uses that are compatible with the overall western Joshua tree conservation strategy (Henson et al. 2018). This work should be done in collaboration with California Native American tribes, state and federal government agencies, local jurisdictions, nongovernmental organizations (NGOs), the public, and affected businesses and property owners. The Mojave Desert region is the homeland territory of many California Native American tribes and is made up of a diverse patchwork of land owned by tribes, federal, state, and local land ownerships and jurisdictions, including the National Park Service (NPS), the Bureau of Land Management (BLM), the US Forest Service (USFS), as well as state and county reserves (Smith et al. 2023). Focus should be on landscape-scale conservation criteria while also engaging with the public to create broad public support (Smith et al. 2023). CDFW will use the Conservation Fund to conserve priority lands.
7. **Identify other impacts and develop management to mitigate them.** The last step is to identify additional factors beyond climate change that could negatively affect the persistence of western Joshua tree (e.g., invasive species, incompatible recreation, inappropriate fire frequencies) and management efforts, including traditional cultural practices, to mitigate these impacts (Morelli et al. 2020). Other impacts on the persistence of western Joshua tree are identified in Section 4.3, "Key Stressors, Threats, and Conservation Issues," and mitigation approaches for them are presented in Section 5.2.1.

There are marked challenges with identifying and protecting existing populations that meet all the necessary criteria for conservation. Some scientists have suggested assisted migration (i.e., human-assisted movement of species in response to climate change) as a management strategy for species limited by dispersal ability, such as Joshua tree (Cole et al. 2011; Williams and Dumroese 2013). However, some ecologists have strongly criticized assisted migration for its potential to promote invasive species, spread pathogens, and disrupt ecosystems (Ricciardi and Simberloff 2009). Assisted migration may have a high rate of failure if species or populations are strongly adapted to local conditions that are not present at the introduction



site (Vitt et al. 2010). Although assisted migration has been suggested for Joshua trees, including in Action LC&M 4.4, “Assisted Migration through Connectivity Corridors”, below, Smith et al. (2023) do not advise this method. This is partially due to suspected high costs and logistical planning needed for success, as well as this approach not preserving intact, functional ecosystems. In addition to what is outlined in Smith et al. (2023), given that there are climate refugia modeled within the current range of western Joshua tree (Shryock et al. 2025), it would be easier to protect the trees where they are currently growing compared with moving them to new places outside the current range. If assisted migration were employed, these areas could still need protection, the trees could need support to establish new self-sustaining populations, and the presence of tribal cultural monitors and a trained arborist may be encouraged (FII CPI, pers. comm., 2024b). More research is needed on assisted migration for western Joshua tree, which is addressed in Action R&I 1.12, “Investigate Assisted Migration where Natural Migration is Unlikely to Occur.”



Source: Anna Cirimele, National Park Service.

Ongoing research and field experiences by public agencies, Tribes, NGOs, and academic institutions will continue to improve the information for western Joshua tree conservation. The Conservation Plan will be reviewed every 2 years, at which time, new information relevant to the Conservation Plan’s goals, management actions, and effectiveness criteria will be incorporated to maintain the standard of applying science including TEK to decision-making. If relevant science is published or new information is available in the middle of an update cycle, updated management approaches may be implemented before the next update of the Conservation Plan, at the discretion and recommendation of CDFW.



## 5.2 MANAGEMENT ACTIONS NECESSARY TO CONSERVE WESTERN JOSHUA TREE

To achieve the Conservation Plan vision, purpose, and objectives described in Section 1.2, “Conservation Plan Vision, Purpose, and Objectives,” five major categories of management actions have been identified: avoidance and minimization, land conservation and management, tribal co-management, research to inform long-term conservation, and education and awareness (Table 5-1). Specific management actions within each of these categories are discussed in more detail below. In addition, Appendix D, “Avoidance and Minimization Best Management Practices and Guidelines” provides detailed guidance for implementing management actions that avoid or minimize adverse impacts on western Joshua tree.

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*“Our task must be to free ourselves...by widening our circle of compassion to embrace all living creatures and the whole of nature and its beauty”*  
*-Albert Einstein*

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**Table 5-1 Management Actions**

| Management Action Title                        | Management Action Topic                                                                                                                                                           |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A&M: Avoidance and Minimization                | Avoidance and minimization to lessen negative effects of human activities.                                                                                                        |
| LC&M: Land Conservation and Management         | Land conservation and management to protect existing populations and increase abundance.                                                                                          |
| TCM: Tribal Co-Management                      | Tribal co-management that reflects California Native American tribes’ interests and priorities, improves decision-making, protects existing populations, and increases abundance. |
| R&I: Research to Inform Long-Term Conservation | Research to inform long-term conservation and improve decision-making.                                                                                                            |
| E&A: Education and Awareness                   | Education and awareness to increase public support and lessen the negative effects of human activities.                                                                           |

### 5.2.1 Impact Avoidance and Minimization

The first priority for conservation of western Joshua tree and its habitat is to avoid adverse impacts altogether. Although climate change stress may be impossible to avoid in the short-term, other impacts are avoidable, such as project-related degradation and destruction of habitat. Impact avoidance should be emphasized as the first preferred choice whenever feasible, especially in areas identified as climate refugia. Furthermore, the importance of avoiding take to western Joshua tree and its habitat has been emphasized during discussions with Tribes, in particular the principle of not harming a tree unless it is absolutely critical for people (FIICPI, pers. comm., 2024b).





When complete avoidance cannot be achieved, efforts should be made to minimize impacts on western Joshua tree and its habitat, and the presence of tribal cultural monitors and a trained arborist to minimize these impacts are encouraged (FII CPI, pers. comm., 2024a). Minimization may include efforts to reduce the number of trees and seeds taken; the area of habitat that is lost or degraded; the severity of impacts on individual trees; impacts on other organisms on which western Joshua tree depends; and indirect impacts on trees, seeds, habitats, and other ecologically related organisms.

The avoidance and minimization actions in this section could be voluntarily adopted and implemented by project proponents and land managers, incorporated into project approvals by local governments and regulatory agencies, or incorporated into voluntary, cooperative agreements between relevant agencies, organizations, and other parties. The Western Joshua Tree Conservation Act (WJTCA) requires the avoidance and minimization of impacts on western Joshua tree to the maximum extent practicable as a condition of obtaining a WJTCA incidental take permit (ITP) (Fish & G. Code, § 1927.3, subd. (a)(2)). WJTCA also states that the Conservation Plan shall include guidance for the avoidance and minimization of impacts on western Joshua trees and protocols for the successful relocation of western Joshua trees (Fish & G. Code, § 1927.6, subd. (a)).

The impact avoidance and minimization (A&M) management actions listed in this chapter are intended to promote the survival of existing western Joshua trees and the protection of their habitat where they could potentially be harmed by development, human activities, and natural hazards. Impacts on western Joshua trees could occur from urban development, infrastructure construction, resource extraction, damage by people and vehicles, and other forms of landscape alteration (see Section 4.3). When these activities affect the root systems or the seedbanks of western Joshua tree, the survival of populations can be compromised.

### **MANAGEMENT ACTION A&M 1: AVOID DIRECT AND INDIRECT IMPACTS**

When landscape-altering projects occur near western Joshua trees, avoidance buffers should be established to avoid direct impacts on above ground and below ground western Joshua tree parts and their seedbank. Scientific information on western Joshua tree root ball width, root zone width, and seedbank width was used to inform direct impact avoidance buffers. Direct impact buffers for avoidance should apply to ground-disturbing activities, such as construction and resource extraction, fire control and suppression, and any other actions that could harm or kill western Joshua trees or seeds. The following actions provide activity-specific guidance for direct impact avoidance.

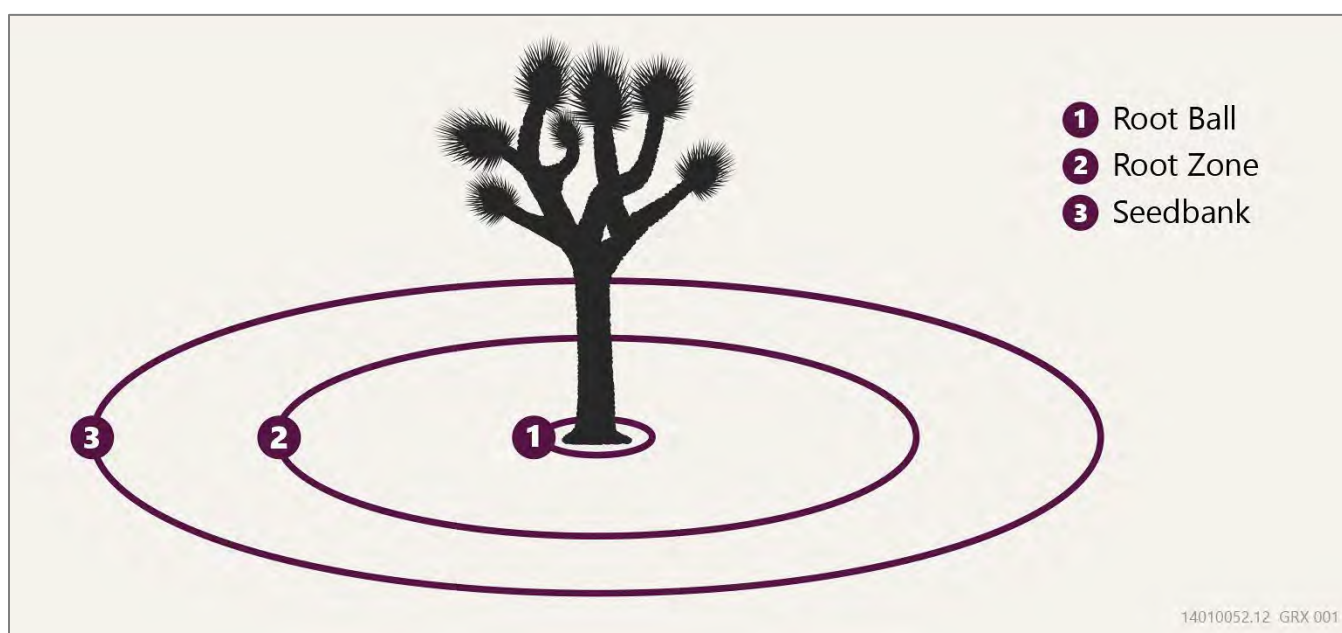


### Action A&M 1.1: Retain Healthy Trees

Project proponents (e.g., private and public entities) or agencies (e.g., local, state, and federal agencies) should prioritize retaining healthy western Joshua trees in place when planning a project. Mature/reproductive western Joshua trees in good condition, western Joshua trees in areas within and adjacent to contiguous suitable habitat, and western Joshua trees in habitat that is prioritized as having high value for conservation should be prioritized for retention in place. Signs a tree is healthy may include 60 percent or more living branches, minimal pest damage, recent unrestricted hard growth, recent flowering, and strong tree vigor (see Appendix E, "Relocation Guidelines and Protocols").

### Action A&M 1.2: Implement Avoidance Buffers

When activities occur in the vicinity of western Joshua trees, project proponents, land managers, and agencies should implement buffers around western Joshua trees to avoid direct impacts to their vulnerable root balls, the root zone where tree roots could occur in the soil, and where living western Joshua trees seeds could be present in the seedbank (see Figure 5-1). In addition to considering characteristics of western Joshua tree root growth and seed dispersal distances, implementation of avoidance buffers should consider other relevant scientific information on adverse effects of impacts to western Joshua tree.



Note: Graphical representation of buffer zones (not to scale).

Source: Compiled by Ascent in 2024.

Figure 5-1 Western Joshua Tree Buffer Zones



Information to consider when determining a buffer may include, but is not limited to:

- Density of trees within each project site as provided by the project census or other biological survey information.
- Location of a tree in relation to existing structures, such as fences, driveways, or other permanent structures.
- Intensity and depth of proposed ground-disturbing activities (e.g., trenching and excavation impacts may be different than installing fencing).
- Duration of proposed impacts (temporary or permanent).
- Additional minimization measures to reduce impacts of buffer encroachment (e.g., supplemental watering, protecting roots and trees from access, or avoiding equipment damage, etc.).
- Geographic location (e.g., Is the project located in an urban, developed, or undeveloped area? Is the project within priority climate refugia?).
- Life stage of tree, including reproductive stage. Branched trees are more likely to have produced seed and may have more extensive root structures.

Disturbances outside of buffers are less likely to negatively affect the health and survival of the tree or its seeds. CDFW may develop guidance for western Joshua tree impact avoidance in the future and update the Conservation Plan, based on available science and other relevant information.

### ***Action A&M 1.3: Avoid Impacts during Pesticide Application***

Project proponents, landowners, land managers, and agencies should not apply pesticides on western Joshua trees and should implement best management practices that avoid pesticide drift onto western Joshua trees, nontarget native vegetation (e.g., nurse plants), pollinators, and seed-dispersing rodents. See Action A&M 1.3.1, “Avoid Impacts during Pesticide Application” in Appendix D for recommended best management practices related to this Action.

### ***Action A&M 1.4: Avoid Impacts Related to Unauthorized Vehicle Use***

Land managers should implement measures to prohibit unauthorized off-highway vehicle (OHV) and other vehicle use off designated trails in western Joshua tree habitat, such as by closing areas outside of designated routes with signage, vertical mulching, or installing other barriers. On public lands authorized for open, overland OHV recreation within western Joshua tree habitat, vehicle use rules should be modified to restrict travel to existing designated trails.



***Action A&M 1.5: Avoid Impacts from Overgrazing***

Land managers and regulatory agencies should prohibit grazing activities within western Joshua tree habitat if grazing is causing adverse effects. This can be accomplished by not renewing existing grazing leases, excluding portions of allotments with western Joshua trees, and installing property fences to avoid free range or trespass grazing. Feral, nonnative grazing animals (e.g., burros, horses) should be removed or relocated from western Joshua tree habitat. However, targeted grazing by prescribed herbivory may be useful to reduce annual invasive species (see Action A&M 2.7, “Minimize Impacts from Grazing Activities,” below, and Action A&M 3.5.1, “Implement Fuel Treatments” in Appendix D) (Berryman et al. 2023).

**MANAGEMENT ACTION A&M 2: MINIMIZE DIRECT AND INDIRECT IMPACTS**

If avoidance is not feasible, direct and indirect impacts on western Joshua tree and its habitat should be minimized. When landscape-altering projects occur near western Joshua trees, effort should be made to minimize direct impacts on western Joshua tree. The following actions provide activity-specific guidance for direct impact minimization.

***Action A&M 2.1: Minimize Impacts from Climate Change***

Climate change is a significant threat to western Joshua tree. All entities, including governments, businesses, and individuals should reduce greenhouse gas emissions to help minimize the impacts of climate change on species (IPCC 2023).

***Action A&M 2.2: Minimize Impacts on Occupied Western Joshua Tree Habitat***

Landowners, developers, and land managers should minimize the area of western Joshua tree habitat that is directly affected by their activities, and minimize the number of trees that are taken or harmed. Western Joshua tree habitat that is in good condition, in ecologically core or intact areas, and within predicted climate refugia should be prioritized first for avoidance and conservation, but if this avoidance is not feasible, impacts on these areas should be minimized to the maximum extent possible. The importance of minimizing harm to western Joshua trees and their habitat has been emphasized during discussions with Tribes. It is important for trained tribal cultural monitors to be present during destruction or removal of western Joshua trees to provide cultural protection of trees and respect ancestral lands (FII CPI, pers. comm., 2024b). Minimization of habitat disturbance should include minimizing impacts on areas with nurse plants and minimizing disruption of the movements of small mammal seed dispersers (e.g., not using rodent barrier fencing).

Minimizing impacts to ecologically core or intact western Joshua tree habitat could potentially be achieved by “low-conflict siting,” a method of land use planning that involves directing development (typically renewable energy development) toward areas of lower ecological value, such as previously disturbed or converted areas (e.g., urban infill, degraded agricultural





land, rooftops), where impacts to sensitive species and habitats would be minimized. In an example of an analysis aimed at identifying low-conflict areas, in this case, for utility-scale solar facility development, Cameron et al. (2012) focused on the western Mojave Desert subregion from the Mojave Desert ecoregional assessment (Randall et al. 2010) described in Section 4.4. Using a planning method based on “avoidance” categories such as lands protected for ecological purposes, sites considered critical to maintaining landscape connectivity, and lands with unique biodiversity attributes; and “attractor” factors that included degraded lands and areas in proximity to infrastructure that would support energy development (e.g., roads, developed communities, transmission lines), the authors identified areas within the subregion that could be prioritized for site-specific evaluation as lower impact areas for solar development.



Similarly, the California Energy Commission (CEC) has compiled land-use datasets used by the CEC, California Public Utilities Commission (CPUC), and California Independent Service Operator (California ISO) depicting environmental constraints to energy development that include biological planning priority areas (e.g., areas of high biodiversity, connectivity, irreplaceability, and critical habitat), areas of terrestrial intactness, and high-quality cropland. These areas of environmental constraints are then used to create “land-use screens,” in which the low/least-conflict areas – areas with a high potential for renewable energy development – are those that remain after land-use screens are applied. The land-use screens can be used to inform renewable energy planning statewide (Hossainzadeh et al. 2023). Considering western



Joshua tree habitat in a low-conflict siting analysis, and potentially including other development types such as housing or industrial development, could provide a proactive approach to minimizing impacts to ecologically core and intact habitat.

### ***Action A&M 2.3: Relocate Trees***

Western Joshua trees should be relocated when project proponents, landowners, developers, and land managers are unable to retain trees in place or when there is a high probability of substantially damaging or lethal impacts occurring to a retained tree. Project proponents, landowners, land managers, and agencies should follow the Western Joshua Tree Relocation Guidelines and Protocols provided by CDFW (presented in Appendix E) when determining whether a tree should be relocated or not. Appendix E also provides a detailed protocol for conducting tree relocations, including recommendations for selecting relocation areas, consideration of maintaining genetic integrity of healthy receiver western Joshua tree populations, methods for physically relocating the tree, types of relocation, and maintenance and monitoring standards. It is important for trained tribal cultural monitors to be present during transplantation of western Joshua trees to provide cultural protection of trees and ensure proper removal methods are followed (FII CPI, pers. comm., 2024b).

### ***Action A&M 2.4: Collect and Store Seeds***

Collection and long-term storage of viable western Joshua tree seeds can preserve local genetic diversity and therefore can help minimize the loss of western Joshua tree diversity from project activities. In addition, seeds kept in long-term conservation storage can provide source material for restoration of occupied or previously occupied habitat or outplanting to unoccupied habitat (such as areas modeled as climate refugia within the buffered climate refugia category and unoccupied future suitable habitat category) and can be used to inform conservation, including targeting locations for conservation nurseries. Seed collection and storage activities should follow Center for Plant Conservation's *CPC Best Conservation Practices to Support Species Survival in the Wild* (CPC 2019) or other accepted standards, and seed collection and storage may be a required minimization measure in western Joshua tree incidental take permits issued by CDFW. CDFW may provide additional specific guidelines and methods for using western Joshua tree seed collection as a minimization measure in the future and update recommendations in the Conservation Plan if necessary.

### ***Action A&M 2.5: Minimize Impacts from Invasive Plants***

Project proponents, landowners, land managers, and agencies should implement best management practices to prevent the spread of invasive plants (Cal-IPC 2012) for all activities that have the potential to spread invasive species in western Joshua tree habitat. These activities include but are not limited to construction, resource extraction, OHV use, outdoor recreation, fire control and suppression, fuel treatment implementation, and



grazing. See Action A&M 2.5.1, “Minimize Impacts from Invasive Plants,” in Appendix D for best management practices.

***Action A&M 2.6: Minimize Impacts during Pesticide Application***

Project proponents, landowners, land managers, and agencies should implement best management practices that minimize pesticide drift or other inadvertent contact affecting western Joshua trees and other nontarget native vegetation (e.g., nurse plants) (see Action A&M 2.6.1, “Minimize Impacts during Pesticide Application,” in Appendix D).

***Action A&M 2.7: Minimize Impacts from Grazing Activities***

When grazing is adversely affecting western Joshua tree, landowners, land managers, and grazing practitioners should decrease grazing intensity when complete avoidance is not feasible (see Action A&M 1.5, “Avoid Impacts from Overgrazing”). Guidance to minimize the impact of grazing can include implementing rotational grazing, lowering stocking rates and the allowable annual forage utilization rate, implementing short grazing periods for herds and long post-recovery (i.e., rest) periods, and retaining sufficient litter and plant cover to protect the soil from erosion and allow plant regrowth. In areas where western Joshua trees are recovering from wildland fire, grazing should be suspended to allow resprouts and seedlings to establish (See Action A&M 3.3.1, “Minimize Impacts from Postfire Rehabilitation,” in Appendix D). In addition, incompatible land uses, such as livestock grazing, should be addressed through the restoration design (see Action L&M 4.3, “Develop and Implement Restoration/Enhancement Plans”). Land managers and project proponents should consult with CDFW prior to implementing prescribed grazing to ensure potential impacts including but not limited to disease transfer to special-status species, including bighorn sheep, are avoided.

***Action A&M 2.8: Minimize Impacts from OHV Use and Outdoor Recreation***

On public lands where OHV recreation is allowed, land managers should restrict OHV use to designated roads and trails. If new trails are developed, they should avoid western Joshua tree populations. Land managers should encourage responsible OHV use behaviors through continued implementation of education programs to minimize damage to western Joshua tree root systems, nurse plants, and seedbanks. Education programs should emphasize practice and principles for responsible outdoor recreation, such as those provided by Tread Lightly (Tread Lightly n.d.) and other organizations.

**MANAGEMENT ACTION A&M 3: MINIMIZE IMPACTS FROM WILDLAND FIRE AND FIRE MANAGEMENT**

Wildland fire is a significant threat to western Joshua tree, but efforts to reduce wildland fire risks, fight active wildland fires, and restore landscapes after fires can also damage western Joshua trees and their habitat. This management action includes activities to minimize impacts





on western Joshua tree from wildland fire, and from fire risk reduction, suppression, and postfire restoration activities. Wildland fire is unpredictable; however, planned activities for responding to wildland fire events can effectively minimize impacts on western Joshua tree habitat.

### ***Action A&M 3.1: Fight Active Wildland Fires***

Land managers and wildland fire responders should aggressively fight and contain active wildland fires in or near western Joshua tree habitat to protect the habitat, minimize loss of western Joshua trees, and sustain western Joshua tree habitat values.

### ***Action A&M 3.2: Minimize Impacts from Fire Suppression***

To minimize impacts on western Joshua trees and their habitats caused by wildland fire suppression response, when it does not threaten the safety of firefighters, the public, or important infrastructure, land managers and wildland fire responders should minimize direct and indirect tree damage or removal, ground disturbance in western Joshua tree habitat, and degradation of habitat values from fire suppression and control activities. Minimum Impact Suppression Techniques (MIST) and best management practices are provided in Action A&M 3.2.1, "Minimize Impacts from Fire Suppression," in Appendix D. Examples of best practices for wildland fire response include using preexisting fuel breaks as fire lines and stopping all habitat-damaging tactics as soon as they are no longer required.

### ***Action A&M 3.3: Minimize Impacts from Postfire Rehabilitation***

Land managers should minimize direct impacts on western Joshua trees after a wildland fire by developing and implementing measures when rehabilitating burned areas. A postfire monitoring plan should include measures to protect existing western Joshua trees, replant western Joshua trees using appropriate seed sources if they no longer exist, replant other native species, control invasive plants, and protect exposed soil as part of plans for landscape revegetation. Appendix D, Action A&M 3.3.1, "Minimize Impacts from Postfire Rehabilitation" contains specific elements to include in a postfire monitoring and control plan.



*Bulldozer, firefighter, and fire engine conducting fire suppression efforts on the Elk Fire in 2024*

*Source: Hannah Schwalbe, National Park Service.*





### **Action A&M 3.4: Minimize Accidental Ignition of Fires**

Best management practices should reduce the potential for accidental ignition of wildland fires and be implemented during construction, outdoor recreation activities, operation and maintenance of infrastructure, and other activities involving overland use of motorized vehicles or mechanical equipment. Fire extinguishers, backpack sprayers, water trailers, or water tenders equipped with hoses should be available to suppress accidental ignitions during hot, dry, or windy conditions. To reduce the potential sources of ignition that may accidentally burn vegetation, best management practices should be implemented as described in Appendix D, Action A&M 3.4.1, “Minimize Accidental Ignition of Fires.”

### **Action A&M 3.5: Implement Fuel Treatments**

Fuel treatments in the vicinity of western Joshua trees could be conducted when appropriate, such as when high fuel loads are present (e.g., invasive plants) or when an area has burned more frequently than the natural fire return interval.

Land managers should develop and implement measures to avoid and minimize direct impacts on western Joshua trees during fuel treatment for wildland fire risk reduction. Several types of fuel treatments that could be implemented in western Joshua tree habitat include fuel breaks, treatments in the wildland-urban interface, and treatments focused on removing invasive species and restoring areas to the natural fire regime (i.e., ecological restoration). Fuel breaks (areas cleared of vegetation or graded as a fuel treatment in anticipation of a fire) have been found to be ineffective at containing wildland fire under certain circumstances, for example high winds (Syphard et al. 2011; Oliveira et al. 2016), but they are useful for firefighter access (Syphard et al. 2011). Treatments in the wildland-urban interface “consist of strategic removal of vegetation to prevent or slow the spread of non-wind driven wildland fire between structures and wildlands, and vice versa” (California Board of Forestry and Fire Protection 2019). Fuel treatments designed for ecological restoration are intended to restore “degraded, damaged, or destroyed ecosystems and habitats to conditions associated with a natural fire regime” and may be implemented in areas where invasive species such as red brome (*Bromus rubens*), cheatgrass (*Bromus tectorum*), Sahara mustard (*Brassica tournefortii*), stinknet (*Oncosiphon pilulifer*), Russian-thistle (*Salsola tragus*), or red-stemmed filaree (*Erodium cicutarium*) or dead, woody debris have increased in cover and have resulted in a shift in the fire regime (Brooks and Minnich 2018; Cal-IPC 2021). Additional guidance to avoid and minimize impacts on western Joshua tree and its habitat during fuel treatments can be found in Appendix D, Action A&M 3.5.1 “Implement Fuel Treatments.”



## 5.2.2 Land Conservation and Management

With climate change as a primary threat to western Joshua tree, protecting and managing lands that are occupied by the species and within the predicted climate refugia category are high priorities for conserving the species. Managing climate refugia and maintaining ecological functions necessary for western Joshua tree survival also allows time for natural systems to adapt and for humans to develop longer-term solutions for conservation (Peterson et al. 2011).

The goal of land conservation is to permanently protect western Joshua tree habitat from development and other incompatible human uses. Conserving lands before habitat degradation and destruction occur is a critical first step toward ensuring the land remains occupied by and suitable for western Joshua tree in the future.

The goal of land management is to create and maintain environmental conditions on conserved land that promote viable populations of western Joshua trees and their habitat. The threats from climate change, wildland fire, invasive species, and other human activities may still be present after land is permanently protected from development. Land management will be necessary to avoid, minimize, and remediate these threats on a long-term basis to ensure that conserved lands continue to support sustained populations of western Joshua trees and the natural processes on which they depend.

Land conservation and management actions have been developed with principles of conservation biology in mind and will be a critical component in achieving the goals of the Conservation Plan.

### MANAGEMENT ACTION LC&M 1: IDENTIFY PRIORITY CONSERVATION LANDS

With finite resources available for conservation efforts, CDFW will define criteria for prioritizing lands that are most suited to the persistence of western Joshua tree. The criteria will help guide agencies, NGOs, Tribes, and others in protecting conservation land. Smith et al. (2023) suggest that western Joshua tree conservation efforts focus on protecting populations that meet criteria for resiliency to climate change and that have demographic signatures of long-term viability. Protecting lands that are already occupied by western Joshua tree should be prioritized because establishing populations of western Joshua tree in new areas is extremely challenging, sometimes controversial, and costly, with a high risk of failure. Nevertheless, it is also important to sustain connectivity of western Joshua tree populations to nearby or adjacent unoccupied habitat that is expected to be suitable for the species in the future and protection of these areas should also be prioritized.



Smith et al. (2023) recommend the following four steps (which are summarized further in Section 5.1 under the seven-step approach to conservation) for identifying locations within western Joshua tree populations that should have highest priority for protection:

1. Identify genetic structure and distinct populations.
2. Develop species distribution models for these populations using high-quality occurrence data to identify climate refugia.
3. Validate potential refugia using demographic studies and other independent data sources.
4. Assess adaptive genetic variation within populations, using either association genetics or, ideally, experimental approaches coupled with genomic data.

Detailed information on the genetic structure, distinct populations, and the adaptive genetic variation of western Joshua tree is not currently known. A species distribution model for western Joshua tree using high-quality occurrence data was developed by Esque et al. (2023) and has been applied to a model developed to identify western Joshua tree climate refugia within the current range and future refugia outside the current range (Shryock et al. 2025). Categories of climate refugia based on these data (described in Section 4.4) were used to help identify priority conservation lands. Detailed range-wide data from western Joshua tree demographic studies to validate potential refugia are not yet available but will be incorporated into the Conservation Plan in the future.

The intactness of ecosystems is an important predictor of ecosystem function and overall conservation value. Ecosystems that are more intact are better equipped to support western Joshua tree habitat functions and are essential for maintaining the species in the future. Parker et al. (2018) updated the ecological assessment conducted by Randall et al. (2010) and assessed the conservation value of areas that overlap western Joshua tree's range as part of an assessment of the impacts of solar and wind development in two locations in California. This assessment was conducted on a coarse scale—2.59 square kilometers (1 square mile) hexagons—based on 2017 conditions. Parker et al. (2018) assigned each hexagon one of the following four conservation values (in order of decreasing value) from the Randall et al. (2010) framework: ecologically core, ecologically intact, moderately degraded, and highly converted.





*Young western Joshua trees growing at high elevation (1,773 meters [5,817 feet])*

*Source: Michael Faist, National Park Service.*

As a range-wide strategy, CDFW will apply conservation priority to the areas identified as climate refugia (comprising categories of predicted and buffered climate refugia, and unoccupied future suitable habitat; see Section 4.4) and assigned conservation values of ecologically core or intact, recognizing they will be the areas most valuable for western Joshua tree in the future. Areas of climate refugia that are moderately degraded may also be valuable for western Joshua tree in the future. Additional information on climate refugia and ecological intactness is in Section 4.4.

On a local scale, CDFW will identify priority conservation lands based on the best available site data relevant to western Joshua tree's ecological needs for long-term viability. Available information will be analyzed initially, and additional information will be collected to properly assess the relative conservation value of the evaluated lands.





Synthesizing the characteristics of land with the highest conservation value for western Joshua tree, priority conservation lands should possess all or at least some of the following attributes:

- A large area occupied by western Joshua tree.
- A high density of reproductive adult individuals.
- Presence within the predicted climate refugia category (prioritizing areas with the highest likelihood of sustaining western Joshua tree under higher emissions scenarios).
- A high recruitment rate.
- Presence of pollinator moths, nurse plants, and small mammal seed dispersers.
- Low risk of stressors from adjacent land use (e.g., fire ignition risk, invasive species encroachment, OHV-related damage, planned development; disturbance from high-traffic roads).
- High-value lands that currently have little to no protection.
- Good overall tree health within populations (e.g., few signs of pests, damage, exposed roots, or health problems; higher vigor; trees and limbs upright).
- Large patch size (low perimeter-to-edge ratio) and connectivity to other areas occupied by western Joshua tree.
- Connectivity to land within the predicted climate refugia category, such as landscape connections across elevation gradients and ecological transition zones (e.g., where desert communities transition to montane communities of the Sierra Nevada and Transverse ranges [Randall et al. 2010] and between the Mojave Desert and Great Basin).
- Genetically distinct populations with adaptive genetic diversity.

A weighted scoring system is useful for evaluating and prioritizing potential conservation lands. CDFW has used the preliminary lands assessment criteria (presented in Appendix F, “Conservation Lands Prioritization Assessment”) as an initial tool to help focus Conservation Fund expenditures on the acquisition and protection of lands with the greatest western Joshua tree conservation value. CDFW will update or revise this tool as needed in the future based on new information and data.

### **MANAGEMENT ACTION LC&M 2: PROTECT PRIORITY CONSERVATION LANDS**

CDFW will apply a multifaceted approach to safeguard conservation lands supporting western Joshua trees on a local scale and within the predicted climate refugia category range-wide. Protection of areas identified as priority conservation lands is particularly important to achieve the goals of this Conservation Plan, but any lands supporting western Joshua tree may contribute to the conservation of the species. Strategies for land



conservation may include designations by state, federal, local, and tribal governments (e.g., designated parks, preserves, monuments, conservation areas, and wilderness areas); protection of lands for conservation by NGOs; acquisition of fee title or conservation easement; and implementation of interagency agreements or written memoranda of understanding (MOUs). Durable legal protection mechanisms are described further in Chapter 6, “Implementation.”

### ***Action LC&M 2.1: Implement Priority Conservation Land Protection***

Lands identified through Management Action LC&M 1, “Identify Priority Conservation Lands,” as high priority for western Joshua tree conservation could be protected through the following implementation approaches:

- Establishment of a State Parks Natural Reserve or Natural Preserve within a State Park or State Recreation Area, CDFW Ecological Reserve, and conserved land under state conservancies or Resource Conservation District land protection programs.
- Purchase or lease of State School Lands from the California State Lands Commission for western Joshua tree conservation purposes.
- Conservation of other state lands through written MOUs or other collaboration agreements with CDFW.
- Designation of national monuments, federal conservation areas, wilderness areas, national parks, and other federal protections.
- Conservation of other federal lands through interagency agreements or written memoranda of understanding and other mechanisms in coordination with US Fish and Wildlife Service (USFWS) (see example agreements in Section 2.2.2, “Federal Listing Status”).
- Acquisition of land by governments, Tribes, or NGOs from willing sellers through fee title or conservation easement acquisition.
- Establishment of conservation easements cooperatively by landowners.
- Written MOUs for conservation on tribal land.
- Establishment and protection of public open space, parks, or/and preserves by local agencies.

### ***Action LC&M 2.2: Track Progress of Conserved Lands***

Regardless of the land protection approaches used, a central tracking system for conserved lands should be maintained by CDFW to track progress in protecting priority conservation lands. The system should use a geographic information system to document locations of protected lands in relation to western Joshua tree’s distribution and priority conservation lands identified under Management Action LC&M 1, “Identify Priority Conservation Lands.”



### MANAGEMENT ACTION LC&M 3: MANAGE CONSERVATION LANDS

Long-term management of conservation lands should be carried out to support western Joshua tree populations and habitat. Land management activities, such as invasive species control, fuel break maintenance, fence repair, garbage removal, monitoring and adaptive management, and law enforcement, are often required to avoid, minimize, and remediate ongoing and persistent threats. Land management is particularly important for priority conservation lands at high risk from wildland fire, invasive species, ongoing and adjacent land use, and illegal or trespass activities. Land management is an important action for maintaining the natural processes western Joshua tree needs in its habitat. TEK would help define beneficial land management practices for western Joshua tree, as discussed in Section 5.2.3, below.



Source: Anna Cirimele, National Park Service.

Management of federal and state lands is typically the responsibility of an agency, with resources allocated based on the budget and priorities of the agency in compliance with its laws and regulations. Although some agencies allocate resources with biodiversity conservation in mind, land use policies or mandates may conflict with conservation priorities and can negatively affect biodiversity. Even if conservation is a priority, agency resources may be limited to implement land management for the benefit of western Joshua tree.

#### ***Action LC&M 3.1: Develop Long-Term Plan for Conservation Lands***

Landowners, land managers, and agencies should develop management and long-term monitoring plans to promote long-term persistence of western Joshua tree on conservation lands. These plans should describe how the land will be managed to maintain habitat function and minimize or remediate threats to western Joshua tree. CDFW will work with land managers



to develop long-term monitoring and management plans or conservation easement stewardship agreements for conserved lands.

Land management plans should be tailored to the needs of individual properties based on site evaluations. Management priorities may include invasive species control, wildland fire risk reduction, cultural burning, restoring degraded areas, and measures to reduce threats from adjacent land uses or to prevent trespassing and unauthorized uses. Monitoring for adaptive management should be incorporated into plans to track the condition of western Joshua trees and other habitat characteristics. Management actions or alternative management approaches should then be implemented, if necessary, based on monitoring results.

Management should emphasize protecting priority conservation lands from wildland fire where fire risk to western Joshua tree populations is high. Maintenance of existing fuel breaks and establishment of new low-impact fuel breaks may be effective approaches to protecting western Joshua tree populations from wildland fire damage. Existing roads and other infrastructure should be maintained as fuel breaks to the extent feasible and effective.

### ***Action LC&M 3.2: Prioritize Management of State and Federal Lands for Western Joshua Tree***

Approximately 2 and 63 percent of the western Joshua tree range in California are on state and federal lands, respectively. Therefore, CDFW will seek to establish written MOUs or other written agreements with state and federal agencies for long-term monitoring and management to benefit western Joshua tree on priority conservation lands. Additionally, a considerable percentage of state and federal lands are within predicted climate refugia. In the low emissions scenario, approximately 28 percent of state and federal lands are within the predicted climate refugia category. For the moderate emissions scenario, approximately 19.2 percent of federal and state lands are within the predicted climate refugia category, and for the high emissions scenarios, approximately 11.6 percent of these lands are within the predicted climate refugia category. The extents of both the current western Joshua tree range and future modeled climate refugia within state and federal lands highlights the importance of managing these lands to conserve western Joshua tree.

### ***Action LC&M 3.3: Establish Endowments and Provide Other Long-Term Funding Mechanisms for Management of Conservation Lands***

Funding for long-term land management is necessary to ensure that critical monitoring and management activities of conservation lands are implemented. Funding may be provided with endowments, annual budgets, grants, use of the Conservation Fund, or other mechanisms applicable to the land management agency, organization, or California Native American tribe.





## MANAGEMENT ACTION LC&M 4: RESTORE AND ENHANCE HABITAT

Restoration of damaged or degraded lands and enhancement of lands to help support western Joshua tree can aid in the conservation of the species. Given that desert ecosystems are slow to recover after disturbance, active restoration can be a valuable tool for increasing ecosystem recovery and improving habitat suitability for western Joshua tree (Abella et al. 2023).

Habitat restoration is the holistic process of reestablishing ecological function and repairing characteristics of a site to return it to a condition that is self-sustaining. Realizing self-sustaining habitat may be achieved under the care of Tribes and/or by aiming to re-create conditions that existed before it was damaged or degraded by natural or human disturbances post-colonization. Restoration actions may include reconstructing natural topography or other physical characteristics of the land, rehabilitating compacted soils, removing invasive plants, and replanting native vegetation. Examples of habitat restoration include replanting western Joshua trees and associated native plants on a site where these species were destroyed by wildland fire and reestablishing natural topography where OHV use created rills and gullies (Abella et al. 2023). In some circumstances, restoring moderately or highly degraded lands occupied by western Joshua tree can provide conservation value for the species overall. Restoration is especially valuable where ecologically core or ecologically intact lands are not available, or where degraded or converted lands are within or connected to land within the predicted climate refugia category.

Habitat enhancement involves the modification of certain characteristics of a site with the goal of increasing specific habitat functions based on management objectives, such as increasing habitat suitability for a particular species (Vaughn et al. 2010). An example of habitat enhancement is vertical mulching a site occupied by western Joshua tree that is lacking sufficient nurse plants to support western Joshua tree recruitment. Another example is implementing projects that use science-based, assisted gene flow methods to introduce climate-adapted genes into stands of western Joshua trees to enhance their capacity for climate adaptation and resilience, provided there is sufficient scientific justification to do so. Habitat enhancement may be appropriate on some ecologically core or ecologically intact conservation lands, such as those within the predicted climate refugia category. Enhancement may also be beneficial on sites that support populations with advantageous genetic traits, such as climate resilience adaptations, to increase seed production or recruitment within those populations.

Assisted migration is another strategy that could support western Joshua tree conservation by facilitating establishment of the species in unoccupied habitat that has become suitable due to climate change; however, concerns have been raised about the costs, uncertainties, and risks of this approach. Any assisted migration of western Joshua tree should therefore be



carefully planned, cautiously implemented, and closely monitored, with a focus on connectivity corridors to existing and future suitable habitat.

Land managers should use a comprehensive restoration approach to return ecosystem functions to degraded sites, or to enhance a site's resilience, ecological function, and ability to recruit western Joshua trees. Where appropriate, funds from the Western Joshua Tree Conservation Fund could be used for restoration efforts on strategically located habitats that have been degraded by fire, invasive plants, development, grazing, unauthorized OHV use, or other disturbances.

#### ***Action LC&M 4.1 Identify Priority Restoration Areas***

Western Joshua tree habitat of high conservation value that is damaged by wildland fire or other stressors should have priority for restoration. Habitat of high conservation value includes sites within or connected to land within the predicted climate refugia category and other priority conservation areas as determined through implementation of Management Action LC&M 1, "Identify Priority Conservation Lands." Other priority restoration sites should be selected based on where land is within the predicted climate refugia category, where research indicates climate-adapted individuals are already found growing. Other factors to consider when evaluating lands for restoration potential include adjacent land uses, western Joshua tree cover and demography, seed sources or presence of a seedbank, soil condition, absence of invasive plant infestation, condition of topsoil, presence of biotic soil crusts, and availability of nurse plants.

#### ***Action LC&M 4.2 Identify Priority Enhancement Areas***

Enhancement should be implemented to improve ecosystem processes on sites already occupied by western Joshua tree to increase recruitment and population resilience. Enhancement projects would be focused on relatively undisturbed areas to ecologically improve western Joshua tree habitats on priority conservation lands. Enhancement activities should be focused on sites that are situated in areas within the predicted climate refugia category or other priority conservation areas where natural processes or habitat functions could be improved for a specific conservation objective, and where enhancement projects will clearly result in an overall net improvement in ecosystem processes for western Joshua tree and its habitat. The following are examples of enhancement for conservation objectives:

- Assist the natural regeneration of western Joshua trees and nurse plants.
- Introduce climate-adapted genes in populations through assisted gene flow methods, such as translocating individuals and outplanting nursery stock.
- Irrigate during drought periods.
- Improve regeneration by introducing yucca moth pollinators.



### **Action LC&M 4.3: Develop and Implement Restoration/Enhancement Plans**

Once a site is identified for a restoration or enhancement project, a detailed design plan for implementing the project should be developed. The design plan should incorporate clear, explicit, and measurable goals based on current baseline potential and site conditions before disturbance. The design plan should include a summary of the site's existing habitat conditions, a description of habitat features required for western Joshua tree persistence, quantitative metrics to define goals and measure success, a monitoring and management plan, an undisturbed reference site to compare with the restoration or enhancement site to help evaluate success, an estimate of the project's cost, and review of the design plan by a qualified desert restoration specialist.



*Western Joshua tree habitat restoration site managed by Mojave Desert Land Trust.*

*Source: Jessie Quinn, Ascent.*

The steps to implementing enhancement activities should be site-specific depending on management goals; however, any potential restoration action on a disturbed site could likely be implemented on a relatively undisturbed site to improve natural processes, habitat functions, or climate resiliency for western Joshua tree.

Typical restoration or enhancement goals for western Joshua tree habitat include increasing western Joshua tree recruitment; increasing cover of native plant species, especially native shrubs; reducing competition from invasive annual plant cover; and stabilizing and repairing soils including soil microbiomes (biocrusts). Typical challenges to achieving restoration or enhancement goals in desert ecosystems include low and unpredictable precipitation; hot, dry summers; infertile, shallow, or damaged soils; intensive herbivory when other forage plants are limited; limited availability of plant resources for revegetating restoration sites; and competition from invasive plants (Abella et al. 2023). The restoration or enhancement design plan should identify methods to address these challenges.

Modified and disturbed habitats often have little or no remaining cover of live western Joshua trees and native associate plants and therefore require active planting as an element of restoration. These sites must be revegetated with western Joshua tree and nurse plant species. Depending on the needs of the site, availability of plant and seed sources, and funding availability, revegetation may use a combination of these methods: outplanting appropriate



nursery stock, salvaging and transplanting from other sites, planting cuttings from plants, and seeding. Ideally, this would include planting western Joshua tree seedlings grown from seeds that are collected from individuals genetically adapted to similar site conditions, from the same general geography, and from individuals with climate adaptive traits. Where necessary and feasible for vegetation establishment, all plantings of western Joshua tree and nurse plants should be caged to prevent damage from herbivory, and supplemental irrigation should be provided. Assisted natural regeneration of western Joshua trees and nurse plants may be an appropriate element of restoration to promote their growth and establishment, which might include tree shelters, removal of competing invasive vegetation, and other techniques based on science including TEK.

Disturbed lands often have degraded soils and may require soil rehabilitation before revegetation. Soil conditions should be evaluated before beginning revegetation, and a strategy for improving soil suitability for western Joshua tree establishment should be incorporated into the restoration design plan as necessary. Soil rehabilitation techniques may include decompaction, roughening soil surfaces, replacing topsoil, and inoculating soil with associated beneficial microorganisms (e.g., arbuscular mycorrhizal fungi).

Active restoration of biotic soil crusts (biocrusts) can be an important part of returning degraded sites to conditions favorable for western Joshua tree by limiting soil erosion, increasing soil organic matter and nutrients, facilitating native plant seed germination, and limiting invasive plant establishment. Arbuscular mycorrhizal fungi live in the soil and form mutualistic symbiosis with plant roots that facilitate nutrients to roots, increase drought tolerance by increasing water uptake in roots, and may increase resistance to soil pathogens. As new research improves understanding of biocrust restoration and arbuscular mycorrhizal fungi associations with western Joshua tree, strategies in restoration plans should be updated and refined.

Vertical mulching consists of placing dead plant material upright into the ground to provide vertical structure that replicates some functions provided by nurse plants, such as shading, trapping windblown sand and seeds, and moisture retention. If appropriate for the site, this technique can be implemented to reduce erosion, discourage vehicle or foot traffic, and facilitate the establishment of western Joshua tree and native shrub seedlings (Abella et al. 2023).

Climate change is predicted to make the region hotter for longer periods of the year and increase the occurrence of droughts, variable precipitation, and intensity of heavy precipitation events; therefore, reducing as many other threats and stressors as possible will increase the likelihood of restoration success (Abella et al. 2023). Anything that degrades the habitat value for western Joshua tree, such as invasive plants, incompatible land uses (e.g., livestock grazing, OHV use), erosion, and wildland fire (e.g., fuel breaks around the restoration site) should be addressed through the restoration design. If appropriate and feasible,





restoration sites should be fenced to prevent human activities (e.g., foot traffic, OHV use, cattle grazing, illegal dumping) from influencing restoration success.

Restoration or enhancement activities should include conducting an invasive species assessment of the site, including mapping infestations. Then, if appropriate, invasive species control should be conducted, using targeted herbicides (e.g., indaziflam) or other treatment methods appropriate for target species, early in the growing season before restoration occurs, as well as for maintenance (see Action A&M 2.6, “Minimize Impacts during Pesticide Application”).

Yucca moths play a critical role in western Joshua tree reproduction; therefore, introducing yucca moth pollinators to restoration or enhancement sites where they are absent should be considered as part of a restoration or enhancement design plan and incorporated as appropriate to facilitate pollination and contribute to successful regeneration. Ongoing monitoring to track moth survival and reproduction and management to protect moths from threats would be necessary for successful establishment of a self-sustaining yucca moth population.



Source: Anna Cirimele, National Park Service.

Regular maintenance and monitoring are necessary to ensure ecological processes are trending toward meeting the goals described in the design plans. Monitoring allows projects to be adaptively managed if performance standards are not being met along the way. Quantitative performance criteria that trigger adaptive management actions if performance standards are not being met should be incorporated into the maintenance and monitoring plan. Monitoring duration and intervals should be included in the plan. Restoration and enhancement projects should be monitored for long periods of time following completion of



the initial restoration or enhancement activities due to the slow nature of desert ecosystem processes. Monitoring, maintenance, and adaptive management should continue until success criteria are met.

#### ***Action LC&M 4.4: Assist Migration through Connectivity Corridors***

Species distribution models suggest that currently unoccupied habitat that is nearby (and in some cases, adjacent to) the current distribution of western Joshua tree will be suitable habitat for western Joshua tree in the future (Cole et al. 2011; Shryock et al. 2025). Western Joshua trees have low capacity to colonize newly available areas on their own; however, given sufficient time, it is reasonable that western Joshua tree would naturally disperse into these unoccupied habitats along accessible connectivity corridors. Humans could help the species to establish in new habitats via deliberate movement of western Joshua trees, seeds, and ecologically related organisms. Such activities are commonly referred to as assisted migration. There has been much discussion and debate over the risks and benefits of assisted migration (Twardek et al. 2023). Assisted migration has been suggested as a conservation strategy for western Joshua tree by some authors (Cole et al. 2011), as well as by tribal representatives (Przeklasa, pers. comm., 2024), but others suggest that the cost, logistical requirements, and ecological concerns make this strategy inadvisable (Smith et al. 2023). Indigenous peoples have translocated species for millennia (Silcock 2018; Rayne et al. 2020), including Joshua tree (see Section 3.3, “Traditional Ecological Knowledge for Conservation”). Nevertheless, there are very few studies on implementation of assisted migration for the purpose of conservation (Twardek et al. 2023). The need for further study of assisted migration is emphasized in Action R&I 1.12.

Opportunities for assisted migration of western Joshua tree may be the most valuable and the least risky where connectivity corridors to future suitable habitat have been identified via modeling (i.e., Shryock et al. 2025), translocation distances are relatively short, and owners and managers of receiving land are supportive. This management action should occur within unoccupied habitat within the buffered climate refugia category that is modeled as climate refugia and unoccupied future suitable habitat category as defined in Section 4.4. Tribal co-management and adaptive management principles may further increase the likelihood of success. Assisted migration of western Joshua tree over short distances are likely to be valuable for conserving the species over the long term but should be implemented carefully and should not be considered an alternative to protecting occupied climate refugia (i.e., areas within the predicted climate refugia category).



## MANAGEMENT ACTION LC&M 5: DEVELOP AND IMPLEMENT A SEED CONSERVATION STRATEGY

While preserving western Joshua tree in the wild is the top priority, developing a seed conservation strategy that includes establishment of seed banks is an important way to minimize loss of western Joshua tree genetic diversity over the long term (see Action A&M 2.4, “Collect and Store Seeds”). Seeds collected for long-term conservation storage could be used to grow western Joshua trees for restoration and enhancement projects or research. With sufficient additional research, the conservation seed bank could provide opportunities to assist gene flow to facilitate climate adaptation by planting western Joshua trees in areas of climate refugia (i.e., within all three climate refugia categories, presented in Section 4.4).

A comprehensive seed conservation strategy should be implemented to develop a seed repository that is representative of western Joshua tree genetic diversity over a wide geographic area across a range of environmental conditions. The seed strategy should include protocols for seed collection, storage, and distribution for conservation and recovery purposes following the guidelines published in Center for Plant Conservation’s *CPC Best Conservation Practices to Support Species Survival in the Wild* (CPC 2019) that will ensure long term preservation of a viable, genetically diverse western Joshua tree population.

### ***Action LC&M 5.1: Develop Seed Collection Standards and Protocols***



*Joshua tree seed pods.*

*Source: Anna Cirimele, National Park Service.*

In collaboration with other agencies and institutions, CDFW will develop and adopt standards and protocols for western Joshua tree seed collection strategies to maximize genetic seed diversity. The seed collection standards and protocols will be designed to conserve western Joshua seeds that are adapted to climates expected to persist in the future. Collections will include seeds from areas at high risk of wildland fire, areas recently subjected to wildland fire, and areas with hotter, drier microclimates (i.e., seeds from

genetically adaptive individuals). This would likely include collection of seeds during mast years. Seed collection could also be a permit condition for take of western Joshua tree (see Action A&M 2.4). The seed collection standards will be based on the Center for Plant Conservation’s *CPC Best Conservation Practices to Support Species Survival in the Wild* (CPC 2019) and will include the following actions:



- Obtain necessary permits from CDFW and permission from the landowner before attempting any collection of western Joshua tree seeds.
- Collect no more than 10 percent of seeds produced within a given western Joshua tree population in any 1 year, or no more than the maximum amount of seeds allowed by CDFW and/or the relevant permitting authority.
- Capture the full genetic diversity of the population by collecting from individuals across the whole site, from as many maternal plants as possible, and from all sizes of seed-producing plants present. Collect seeds over multiple years, if possible, to increase genetic diversity of seeds collected.
- Collect only mature seeds and collect the full diversity of seed morphologies represented in the population.
- Track seed origin, or georeferenced latitude and longitude, of the parent plant from which the seeds were collected. Seed origin is important because genetic material and adaptations of seeds can vary widely between different locations. Offspring from seeds collected in a specific geography may not be genetically adapted for growth under environmental conditions in another location. Therefore, tracking their origin can help identify the geographic range suitable for growing the seed, increasing the odds of successful growth.
- Record accession information for seed collections, such as collector, date, location, habitat and associate species information, population demographics, and number of individuals from which seeds were collected.

### ***Action LC&M 5.2: Develop Seed Storage Standards and Protocols***

Stored seed will be important for use in ecological restoration/reforestation projects and assisted gene flow programs. Assisted gene flow programs could be used to enhance climate change resilience by translocating genetically adaptive individuals into western Joshua tree populations that do not currently support individuals with climate change adaptations. Seed viability and germination testing should be conducted prior to being put into storage and then retested for viability at regular intervals and before seeds are used to grow trees. Seeds should be stored following practices that promote high seed quality and increase seed longevity, as discussed in CPC (2019), such as:

- Keep accurate records, including documentation and accession information.
- Clean seeds prior to storage.
- Follow the recommended drying conditions.
- Package seeds from different maternal lines separately.





- Divide collected seeds into two batches and store at separate storage institutions to mitigate loss from natural or human-caused catastrophe.
- Adhere to the appropriate moisture targets to maintain relative humidity during storage.
- Store at the appropriate temperature.
- Monitor storage conditions and seed viability.

### ***Action LC&M 5.3: Develop Nursery Standards and Protocols***

Nurseries used to grow seedlings should be qualified and abide by established standards and protocols. When western Joshua tree plants are required for restoration projects or assisted gene flow attempts, viable seeds from the repositories should be grown in a qualified nursery until seedlings have established to a point where they have a greater chance of survival in the wild. Standards should include guidance on plant and seed distribution and tracking, how long juvenile plants should grow in the nursery before they are ready for outplanting, proper soil mixtures, watering schedules, recommended pot sizes, and how seedlings should be transported to identified restoration and outplanting sites. CDFW may develop nursery standards and protocols for western Joshua tree propagation and outplanting and include them in a future Conservation Plan update, if necessary.

### **5.2.3 Tribal Co-Management**

CDFW recognizes that California's Native American tribes have long taken care of California's fish, wildlife, and plants and possess unique and valuable expert knowledge and practices for conserving and using these resources in a sustainable manner. Engaging in co-management is key for western Joshua tree conservation, and it is important to do so in ways that respect the interests and priorities of Tribes. The goal of co-management is to collaboratively share management functions and responsibilities for conservation of western Joshua tree and its habitat. Co-management provides an avenue to improve the conservation strategies by ensuring Tribes have access and pathways to implement their extensive life experience and unique understanding of the landscape. This also ensures their knowledge is incorporated into the Conservation Plan, as appropriate, while acknowledging that the Tribes choose what and how knowledge is shared.



Source: Native American Land Conservancy.



The process to develop meaningful co-management will require time that extends beyond the publishing timeline of the Conservation Plan. TEK shared by Tribes will influence management actions in the Conservation Plan. In turn, this tribal knowledge and guidance will inform specific standards for co-management of the species. The actions in this section describe establishing the framework needed to guide development, incorporation, and implementation of co-management functions and responsibilities.

## MANAGEMENT ACTION TCM 1: ESTABLISH CO-MANAGEMENT PRINCIPLES

Collaboratively establishing core principles of co-management is an essential first step toward co-creating written agreements and long-term collaborations between the State and Tribes for western Joshua tree conservation. The goal of developing co-management principles is to guide future decision making and the elements of co-management practices between CDFW and Tribes. These core principles may include expectations and use of vocabulary that signifies the respect, commitment, intent, and responsibilities of multiple sovereign governments and integrate their respective management philosophies into mutually beneficial approaches to achieve a common set of goals. It is important that the co-management principles reflect tribal interests and priorities that complement other actions designed to implement WJTCA and to comply with other California laws. Therefore, development of co-management principles requires time and multiple discussions to achieve an approach and written agreement that works for both CDFW and Tribes. This will warrant ongoing work together after the initial approval of the Conservation Plan.

After reviewing the Advisory Council on Historic Preservation's Policy Statement on Indigenous Knowledge and Historic Preservation (ACHP 2024), CDFW developed initial foundational commitments, which was requested by tribal members (FIICPI, pers. comm., 2024a). A draft of CDFW's foundational commitments is provided in Appendix G, "Foundational Commitments by CDFW for Developing Western Joshua Tree Conservation Plan Co-Management Principles with California Native American Tribes." The following topic summaries are addressed in the commitments:

- **Respect and relationship building.** Tribal knowledge, including TEK, will be treated with respect in all circumstances.
- **Valid and self-supporting knowledge.** TEK held by a tribe is a valid, sound, and self-supporting source of information and is an aspect of science.
- **Cultural and religious significance of Traditional Ecological Knowledge.** Conservation actions affect resources and properties that may be of religious and cultural significance to tribes.



- **Fair compensation.** If a state agency requests a tribe to provide TEK via research, survey, monitoring, or other efforts, the state agency and the tribe are encouraged to collaborate to identify potential funding mechanisms (which may include grants, to the extent permitted by applicable laws and regulations and sufficient resources) to fairly reimburse or compensate the tribe.
- **Transparency and records of tribal involvement.** Maximum transparency is essential to demonstrate how and what tribal priorities, including TEK and other sensitive information, will be documented in conservation project records.
- **Consultation timelines.** Timelines will reflect the complexity and nature of the undertaking and will recognize and seek to accommodate to the capacity of tribes throughout the decision-making processes.
- **Professional qualifications of tribal representatives.** The State recognizes that representatives of tribes have professional qualifications.
- **Managing and protecting sensitive tribal information.** The State will prevent or limit to the maximum extent feasible any inappropriate disclosure of confidential or sensitive information through all available mechanisms.



Source: Jessie Quinn, Ascent.





## MANAGEMENT ACTION TCM 2: MUTUALLY DEFINE ELEMENTS OF CO-MANAGEMENT

Guided by the foundational commitments and co-management principles from Management Action TCM 1, “Establish Co-Management Principles,” CDFW and California Native American tribes will co-create elements of the Western Joshua Tree Conservation Plan actions that incorporate tribal values, knowledge, priorities, and co-management on tribal land or other properties that contain resources or lands that may be of religious and cultural significance to Tribes. Mutually defining elements that should be included in co-management agreements to carry out both traditional and contemporary land stewardship practices promote meaningful collaboration and tangible outcomes. The following actions present elements that need to be addressed and agreed upon with Tribes for inclusion as co-managed conservation actions:

- Articulate a process for take of western Joshua tree by California Native American tribes in a culturally appropriate manner or for a specific purpose (FIICPI, pers. comm., 2024a).
- Continue consultation to provide a platform for Tribes to articulate aspects of TEK that include spiritual and cultural elements that may be new to agencies. Agencies should seek to consider these unfamiliar aspects of environmental protection and include them in guidance and policies (FIICPI, pers. comm., 2024b).
- Upon request of a California Native American tribe, collaborate on developing a process to relocate western Joshua trees to tribal lands when there is an opportunity to do so. For example, an opportunity may be related to coordinating with a developer that is openly seeking a pathway for relocating trees they are permitted to take.
- Encourage the presence of tribal cultural monitors at development or other ground-disturbing projects during the salvage, destruction, or removal of western Joshua trees as a measure to provide spiritual and cultural protection to western Joshua trees that are either taken or are affected in the project area. Ideally, tribal cultural monitors may also be trained as arborists working as desert native plant specialists to ensure proper salvaging methods are implemented (FIICPI, pers. comm., 2024b).
- Encourage employment of trained tribal members or local tribal conservation crews to support restoration and relocation efforts of western Joshua trees that are carried out with cultural and biological integrity.
- Collaborate with Tribes to identify where ethnographic studies are requested. Identify needs and potential resources, including but not limited to funding, so Tribes can carry out these studies.
- Identify priority lands of significance to individual California Native American tribes that may overlap with the biological criteria outlined in Management Action LC&M 1, “Identify





Priority Conservation Lands” so that they can be prioritized for long-term conservation and tribal stewardship.

- Collaborate and identify initiatives for tribal management of western Joshua trees, for example, supporting nurseries developed and led by California Native American tribes for western Joshua tree conservation.
- Incorporate California Native American tribes’ TEK or provide supporting pathways for Tribes to implement TEK into western Joshua tree conservation strategies. For example, Tribes and CDFW will collaborate to incorporate cultural burning where it would be an effective tool (outlined under Management Action LC&M 3, “Manage Conservation Lands”) for reduction of wildland fire risk or enhancement of western Joshua tree population conditions on tribal lands (ACTCI, pers. comm., 2024).
- Collaborate and identify all applicable and available sources of funding (including but not limited to the use of the Conservation Fund) to support tribal TEK implementation. Non-tribal parties assuming TEK implementation responsibility without explicit tribal permission would be a breach of intellectual property use and would be an extractive practice toward the California Native American tribes (FTBML, pers. comm., 2024).
- Develop written MOUs or other written collaboration agreements between CDFW, California Native American tribes, and relevant entities that would embody co-management principles (see Section 6.4, “Tribal Co-Management”).

### 5.2.4 Research to Inform Long-Term Conservation

The scientific understanding of the long-term persistence of western Joshua tree is evolving as research continues. It is currently difficult to determine what ecological factors are influencing long-term persistence. These difficulties are centered around a lack of range-wide demographic data and the amount and frequency of recruitment necessary to maintain populations, uncertainty about the magnitude and timing of heat and drought stressors and how western Joshua tree will respond, and lack of information about the environmental tolerances and population dynamics of yucca moth (USFWS 2023). Therefore, additional research is necessary to fill these information gaps.

#### MANAGEMENT ACTION R&I 1: CONTINUE RESEARCH AND INFORMATION DEVELOPMENT

CDFW will encourage scientific research needed to inform effective conservation of western Joshua tree. There are currently numerous information gaps related to species genetics, distinct populations, demography, distribution, microbial associations, fire effects, climate response, and other factors that will be important to the conservation and management of western Joshua tree. Science and research are fundamental to long-term species conservation and for



developing meaningful strategies to avoid, minimize, and mitigate threats to western Joshua tree. The seven-step approach recommended by Smith et al. (2023) for effective species conservation in the face of climate change requires acquisition of information that is currently lacking for western Joshua tree. Research also provides a foundation from which to track the success of conservation and management actions and adapt management strategies as needed if monitoring indicates performance targets are not being met.

### ***Action R&I 1.1: Identify Genetic Structure and Distinct Populations***

Research focused on genetic studies is needed for western Joshua tree conservation. Preserving a species' full range of genetic variation is one of the pillars of conservation biology. Understanding the range of western Joshua tree's genetic variation is needed to inform effective conservation. Specifically, genomic research is needed following these steps, which are outlined in Smith et al. (2023):

- Quantify neutral diversity (i.e., genetic variation that is not affected by natural selection).
- Delineate genetically distinct populations.
- Identify climate-adaptive variants.
- Catalog adaptive diversity (i.e., range of adaptive traits that make individuals better suited to withstand the effects of climate change and other stressors).

### ***Action R&I 1.2: Collect and Analyze Range-Wide Demographic Information***

Develop a program of long-term, range-wide direct population and vegetation monitoring with emphasis on leading and trailing edges, and highest and lowest elevations of the species' range in California. Range-wide demographic information is needed to detect baseline population trends, and identify populations with high recruitment (i.e., addition of new adult plants that develop from seeds or sprouts) and those that do not appear to be recruiting/reproducing new individuals onsite at sustainable levels (i.e., plants are not reproducing at a sufficient rate to replace themselves generation after generation). Researchers should look for collaboration opportunities to develop standardized monitoring protocols to collect demographic data and abundance trends across the species' range, and to establish and maintain a database for data collected.

### ***Action R&I 1.3: Develop Refined Species Distribution Models***

Once genetically distinct populations have been delineated, research should use these data to develop refined species distribution models to help identify habitat suitable for western Joshua tree in the future (Smith et al. 2023). Potential refugia models should be validated with range-wide demographic data collection and other independent data sources (Smith et al. 2023).



***Action R&I 1.4: Assess Adaptive Genetic Variation***

Research should evaluate climate adaptive genomics. Once genetic variation of the species is better understood, researchers should identify subpopulations with adaptive traits that make them better suited to withstand the effects of climate change. Researchers should consider genome-wide association studies, as recommended by Smith et al. (2023), to identify adaptive genes responsible for greater tolerances to heat, drought, and other stressors. Genotypes (genome sequence data) of individuals that survive climate extremes and from populations with greater numbers of individuals with these adaptive traits should be prioritized for conservation and used for assisted gene flow (i.e., relocating genetically adaptive individuals or their propagules to areas already occupied by western Joshua tree to facilitate climate change adaptation).

***Action R&I 1.5: Study Yucca Moth***

Research should investigate the western Joshua tree's obligate pollinator, yucca moth's life history, environmental tolerances, distribution, local adaptation to host plant populations, and association genetics or other approaches to identifying adaptive genetic variation (see "Pollination" in Section 4.1.3). Researchers should produce range-wide species distribution models for yucca moth; determine the percentage of larvae in diapause that are lost to predation and other factors, such as project-related impacts; and study the cues that trigger metamorphosis.

***Action R&I 1.6: Update Ecoregional Assessment***

Update previous work done by Randell et al. (2010) and Parker et al. (2018) or other datasets to assess ecological intactness within the entirety of western Joshua tree's range.

***Action R&I 1.7: Research Microbial Associations and Restoration Techniques***

Research should investigate biocrust associations and arbuscular fungi associations and their role in western Joshua tree conservation, as well as other microbial associations that may be important to western Joshua tree survival. Research should include techniques to restore biocrusts and fungi associations important to western Joshua tree, such as biocrust salvage and transplantation in the wild, and propagation and inoculation techniques in nursery settings. Biocrusts could also be applied to fuel breaks to reduce exposed soil and limit invasive plant establishment while maintaining effective fuel breaks (Condon et al. 2023).

***Action R&I 1.8: Investigate Fire Resilience/Postfire Recovery***

Research should investigate fire resiliency of western Joshua tree and its nurse plants. Studies could include postfire monitoring of western Joshua tree recruitment, seed production of trees that survive, or basal sprouting. Sweet et al. (2023) suggests monitoring could include collecting baseline data in nurse plant cover at burned sites and following recruitment



patterns. Research should also investigate fire regime-plant community interactions, including the positive feedback loop invasive plants can have on promoting recurrent fire in western Joshua tree habitat (Brooks and Matchett 2006). This research should consider impacts of annual rainfall amounts to inform when invasive plant control is needed to protect western Joshua tree populations (Brooks and Matchett 2006).

### ***Action R&I 1.9: Investigate Invasive Plant Control Techniques***

Research should investigate the most effective ways to control the spread and abundance of invasive plant species to reduce fire risk through the following possible activities:

- Identify the most effective treatment strategies to manage invasive species that optimize benefits while minimizing negative tradeoffs under a range of conditions (Abella et al 2023; Reed et al. 2009; Darst et al. 2013; Tuma et al. 2016).
- Investigate indirect effects of herbicide application (e.g., indaziflam) in western Joshua tree habitats, particularly on western Joshua tree seedlings and nurse plants, as well as other native plants. Using this information, identify demographic effects and appropriate avoidance buffer standards and application methods for herbicide use in areas occupied by western Joshua tree (Abella et al 2023).

### ***Action R&I 1.10: Research Long-Term Climate Effects***

Research should investigate the effects of multiyear and multidecade climate variability patterns on western Joshua tree recruitment, survival, and population density. Research should aid the development of a large-scale demographic study that is needed to inform conservation acquisitions and other forms of protection.

### ***Action R&I 1.11: Study Salvage and Relocation Methods***

Evaluate and improve salvage and relocation methods to increase survival of western Joshua trees salvaged from development sites and transplanted to mitigation sites. Successful relocation can increase the persistence of western Joshua tree and ensure genetic diversity and adaptive variation are retained from populations lost to development.



Source: Drew Kaiser, California Department of Fish and Wildlife.





***Action R&I 1.12: Investigate Assisted Migration where Natural Migration is Unlikely***

Research the feasibility, practicality, effectiveness, and risks of implementing future assisted migration and translocation of western Joshua tree into areas modeled as climate refugia to which the species cannot naturally migrate (Figure 5-2) or would migrate to very slowly (Cole et al. 2021; Shryock et al. 2025). This information could be used to inform the usefulness of conserving lands that are outside the current range of western Joshua tree but that may become suitable for the species in the future under different climate scenarios. Western Joshua trees have low capacity to colonize newly available areas on their own because of their low dispersal ability and limited connectivity between currently occupied and potential future habitat. Assisted migration is frequently contemplated as a conservation tool to get species to newly available habitat; however, there are few studies on the implementation of assisted migration for the purpose of conservation (Twardek et al. 2023). The studies that have been conducted generally examine only short periods of time and rarely provide information on the translocated species' population and ecological community-level impacts and outcomes. Further study is needed to test the effectiveness of assisted migration of western Joshua tree, and to determine how it can be done cost effectively and without adverse effects to the receiving ecosystems (Smith et al. 2023).

***Action R&I 1.13: Study Basal Sprout Survival and Vulnerabilities***

Research the resource needs (e.g., nutrients, water) and vulnerability of basal resprouts of western Joshua tree to increase persistence, for example, whether they may be vulnerable to drought or herbivory. Further study could include an analysis of survival data based on various environmental and biological factors and may include unburned reference sites for estimating background mortality. Analysis of these data is ongoing pending further funding support (Sweet et al. 2023). These data will enhance understanding of demographic trends. Research should help inform potential site-specific management needed to ensure growth and survival of individual western Joshua trees.

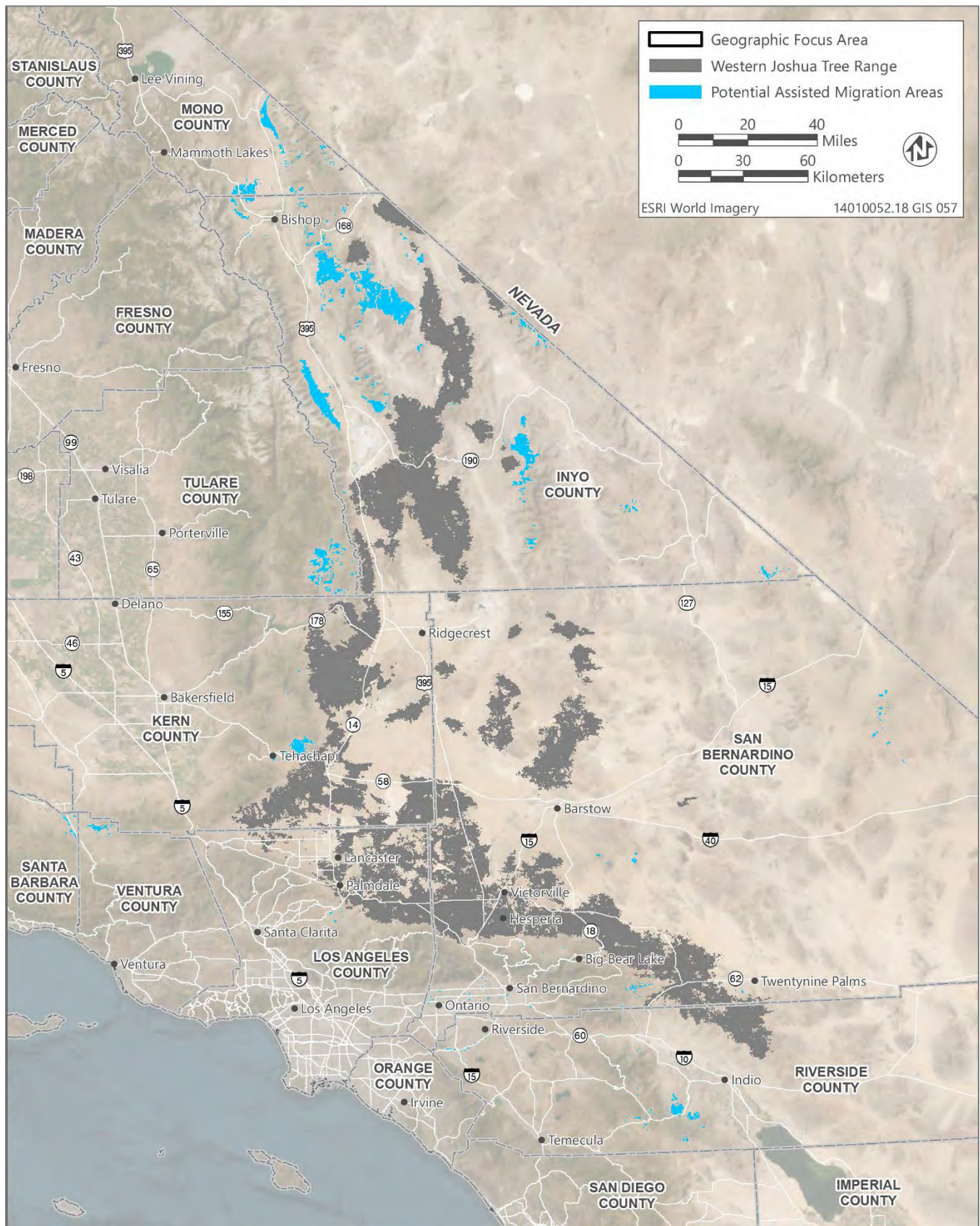
***Action R&I 1.14: Tribal Ethnobotanical Studies***

Ethnobotanical studies of the greater Mojave Desert and Great Basin regions and western Joshua tree habitat should be conducted if requested by a California Native American tribe. Ethnobotanical studies research how people of a particular culture and region use native plants for food, medicine, shelter, dyes, fibers, oils, resins, soaps, waxes, ceremonial purposes, and more (USFS n.d.).

***Action R&I 1.15: Develop Additional Fuel Treatment Methods***

CDFW will coordinate with California Department of Forestry and Fire Protection (CAL FIRE) and others on developing additional fuel treatment methods for western Joshua tree habitat, including manual and mechanical treatment methods. Once developed, these treatment methods could eventually be included in the minimization measures in Section 5.2.1, above.





Source: Shryock et al. 2025; adapted by Ascent in 2024.

**Figure 5-2 Potential Assisted Migration Areas Where Natural Migration is Unlikely**



### 5.2.5 Education and Awareness

Education and awareness programs will enhance public understanding of western Joshua tree ecology, foster community pride and ownership of western Joshua tree conservation, connect people with their natural world, and inspire people to care about western Joshua tree and its habitat so they will support conservation of the species. A key priority will be ensuring that underserved and overburdened communities have access to—and can engage in—education and awareness programs and opportunities.

#### MANAGEMENT ACTION E&A 1: SUPPORT EDUCATION AND OUTREACH

Education and outreach programs that increase awareness and appreciation of the cultural, biological, and ecological value of western Joshua tree may provide long-term benefits for conservation of the species. Education and outreach programs can also promote opportunities for all communities to be involved with western Joshua tree appreciation, stewardship, and conservation.

##### ***Action E&A 1.1: Support Tribal-Led Educational Outcomes***

CDFW will work with Tribes to support tribal priorities for education and outreach to their communities. The following are examples of undertakings or materials that may be developed to support tribal-led and tribal-designed efforts:

- ethnobotanical studies,
- lesson plans and curricula for various age groups,
- professional certification programs (e.g., for tribal cultural monitors, TEK practitioners, fire and restoration specialists),
- printed materials designed to strengthen cultural knowledge, and
- workshops.

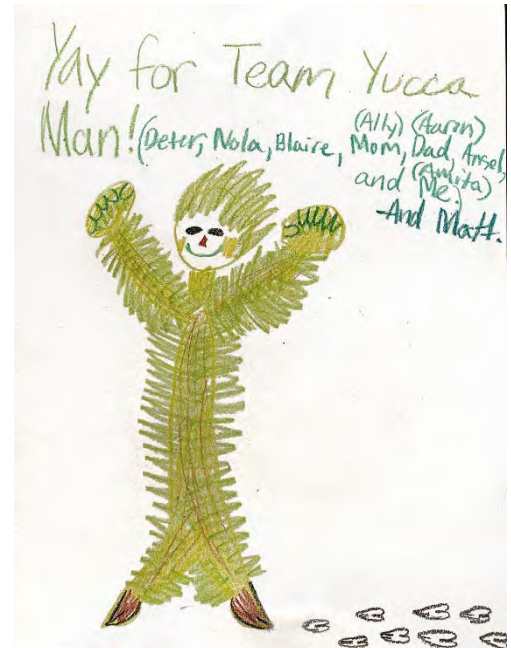
##### ***Action E&A 1.2: Develop Publicly Distributed Information***

CDFW will work with partners to develop accessible informational items for distribution to the public in multiple languages. The informational items may be handouts, brochures, presentations, digital materials, surveys, interactive web pages, or other outreach tools. Materials should be made available to communities throughout western Joshua tree's range in California with a dedicated focus on reaching underserved communities. Informational items may include the following materials:





- a handout describing how to care for western Joshua tree with information on:
  - watering (none unless they show signs of heat/drought stress),
  - invasive plant removal,
  - nurse plant species to incorporate into landscaping, and
  - signs of pests and solutions for pest infestations;
- science kits, handouts, and web-based western Joshua tree activities for schools to educate young citizens about western Joshua tree and its need for conservation such as:
  - coloring and activity sheets focused on western Joshua tree “fun facts” and biology;
  - a western Joshua tree junior ranger program based on collecting information about the species; and/or
  - a science kit developed in collaboration with local scientists and educators that includes hands-on activities through storytelling, art, or field trips, focusing on western Joshua tree and climate change impacts and solutions, such as a traveling trunk for Climate Kids with the Climate Science Alliance;
- materials and opportunities for the public to participate in western Joshua tree conservation efforts and education, such as:
  - a calendar of volunteer events (e.g., seed collection and restoration) and educational webinars,
  - iNaturalist citizen science project information, and/or
  - Information on recreating outdoors with western Joshua trees responsibly (see Action A&M 2.8, “Minimize Impacts from OHV Use and Outdoor Recreation”);
- collaborations to fund and open a western Joshua tree art gallery or exhibit that could be made available to the public within the geographic focus area of this Conservation Plan and virtually online; and/or
- interactive, web-based ArcGIS StoryMaps for western Joshua tree conservation and education.



Source: Amita Bubbl.





### ***Action E&A 1.3: Establish a Tree Adoption Program***

CDFW will reach out to partners to encourage organizations to develop opportunities for an adopt-a-Joshua tree program. This program may include the following activities:

- establishing a program in which members of the public can “adopt” western Joshua trees salvaged from development sites and replant them on their private property, and/or
- providing signage that landowners can place on their property to identify “adopted” western Joshua trees.

### ***Action E&A 1.4: Explore Authorizing a Specialized Interest License Plate***

CDFW or other organizations may coordinate with the California Department of Motor Vehicles to develop a specialized western Joshua tree interest license plate. Monies generated from sales of the license plates could be added to the Conservation Fund.

### ***Action E&A 1.5: Support Media Promotion***

CDFW will coordinate with partner organizations to encourage development of newsletters and conduct western Joshua tree–focused social media campaigns.

### ***Action E&A 1.6: Support Volunteer Opportunities***



*Cattle sheltered by western Joshua trees.*

CDFW will support and encourage volunteer opportunities by promoting them on their website, social media, and printed media (e.g., handouts, newsletters). Special focus will be given to providing opportunities for underserved (i.e., communities that have historically received inadequate investment, resources, or services) and overburdened (i.e., communities that are disproportionately affected by pollution, environmental hazards, and health risks) communities and young

people to participate in and benefit from. This includes connecting these communities with natural areas containing iconic western Joshua trees.

The following volunteer programs may benefit western Joshua tree:

- National Park Service Volunteers-In-Parks (VIP) program,
- California State Parks Volunteer in Parks Program,
- Mojave Desert Land Trust volunteer programs,
- Transition Habitat Conservancy volunteer programs,



- CDFW-led seed collection/banking efforts,
- Yucca weevil tracking projects, such as Mojave Desert Land Trust's 2023 Yucca Weevil Watch hosted on iNaturalist, and
- western Joshua tree flowering/masting tracking projects hosted on iNaturalist.

### ***Action E&A 1.7: Develop Guidance for Grazing Practices***

CDFW will coordinate with agricultural organizations to encourage development of guidance regarding grazing best practices in western Joshua tree habitat and make it available to ranchers, rangeland managers, and others in the grazing community.

### ***Action E&A 1.8: Encourage Urban Conservation and Recovery***

CDFW will coordinate with local governments to encourage the development of educational materials for private residential and other property owners with western Joshua trees to participate in urban conservation and recovery efforts.

## **5.3 EFFECTIVENESS CRITERIA**

The management actions described in this chapter are necessary to achieve the vision, purpose, and objectives of the Conservation Plan. WJTCA requires that the Conservation Plan include objective, measurable criteria to assess the effectiveness of management actions. This section presents preliminary effectiveness criteria to help CDFW and the Commission measure how effective the management actions are in conserving western Joshua tree. These criteria are divided into two sets. One set of criteria is related to the overall conservation of western Joshua tree in California, and the other set of criteria is related to the effectiveness of the Conservation Plan and the use of the Western Joshua Tree Conservation Fund in making progress toward the vision of this Conservation Plan. Although these two sets of criteria are interrelated, the former set is more relevant to the Commission's decision-making authority under the California Endangered Species Act (CESA), and the latter is more relevant for assessing the effectiveness of this Conservation Plan and the Western Joshua Tree Conservation Fund as implemented by CDFW. The metrics needed to evaluate some of the effectiveness criteria will be informed by future research described in Section 5.2.4, and therefore will be refined in future Conservation Plan updates.

### **5.3.1 Effectiveness Criteria for Conservation of Western Joshua Tree in California**

- By 2033, when the Commission must reconsider whether listing western Joshua tree is warranted (Fish & G. Code, § 1927.9), a large and genetically representative distribution of western Joshua tree is permanently protected and managed to maximize ecological



function for the species and its co-occurring native species. This criterion is dependent on science regarding western Joshua tree population genetics described in Action R&I 1.1, “Identify Genetic Structure and Distinct Populations” and on models of the predicted climate refugia category. The target for this criterion is 70 percent of priority conservation lands, as identified through Management Action LC&M 1, “Identify Priority Conservation Lands,” across the full range of western Joshua tree in California.

- A program to monitor and assess western Joshua tree population status based on science has been developed and adopted, as described in Action R&I 1.2, “Collect and Analyze Range-Wide Demographic Information” and based on Actions R&I 1.1, 1.3, “Develop Refined Species Distribution Models”, 1.4, “Assess Adaptive Genetic Variation”, 1.5, “Study Yucca Moth”, and 1.13, “Study Basal Sprout Survival and Vulnerabilities”, and assessments under this program demonstrating that western Joshua tree is sustainable in California for the foreseeable future, per R&I 1.10, “Research Long-Term Climate Effects.”
- Cooperative multiagency strategies are in place to reduce fire risk, aggressively fight wildland fires that threaten western Joshua trees, and fully fund restoration plans that will be implemented in response to wildland fires that kill a demographically significant number of western Joshua trees as identified by Management Action A&M 3, “Minimize Impacts from Wildland Fire and Fire Management” Management Action LC&M 4, “Restore and Enhance Habitat,” and informed by Action R&I 1.15, “Develop Additional Fuel Treatments.”
- Ninety (90) percent of land within the predicted climate refugia category that is ecologically core, ecologically intact, or moderately degraded when conservation lands are identified, as determined through Management Action LC&M 1, is permanently protected and managed to maximize ecological function for the species and its co-occurring native species (see implementation approaches in Action LC&M 2.1, “Implement Priority Conservation Land Protection”). For the purposes of this criterion, land within the predicted climate refugia category shall be any area predicted to be suitable for the species under low (SSP 2-4.5), moderate (SSP 3-7.0), or high (SSP 5-8.5) emissions modeling scenarios for the 2071 through 2100 timeframe, as it is defined in Section 4.4. The measurable details of this criterion should be science-based and informed by the research actions in Section 5.2.4 and climate refugia models, and therefore may change as relevant information improves.



Source: Anna Cirimele, National Park Service.



### 5.3.2 Effectiveness Criteria for the Conservation Plan and the Western Joshua Tree Conservation Fund

- Initial draft priority conservation areas have been identified by December 2025.
- Every 2 years, beginning in 2026 (Fish & G. Code, § 1927.8, subd. (a)), the acreage of priority conservation lands preserved in perpetuity is greater than in the prior 2-year review period. CDFW will first focus on protecting priority conservation lands identified via Management Action LC&M 1, “Identify Priority Conservation Lands.” CDFW will seek to protect an additional 3 to 5 percent of occupied western Joshua tree range every 2 years until the effectiveness criteria related to land protection for conservation of western Joshua tree in California are achieved.
- Conservation lands that are protected via the Conservation Fund have an endowment that is sufficient to fund management to maximize ecological function for the species and its co-occurring native species in perpetuity.
- At least one USFWS- and CDFW-approved written MOU or other written collaboration agreement has been established on federal land that protects and safeguards priority conservation lands representing at least 10 percent of occupied western Joshua tree range by 2033.
- At minimum, one written MOU or other written collaboration agreement incorporating co-management principles has been established between CDFW or other land managers and California Native American tribes by 2028.
- As measured every 2 years, more local jurisdictions have incorporated the Conservation Plan’s A&M measures into adopted plans and policies.
- CDFW, local fire departments, CAL FIRE, and federal agencies have developed and implemented guidelines for avoiding direct impacts on western Joshua trees during wildland fire suppression and control activities, for fuel treatment implementation, and for preventing accidental ignition of fires during other activities, such as construction and recreation. Local fire departments in the geographic focus area, CAL FIRE, and federal agencies have entered into agreements with CDFW to implement the guidance. The number of jurisdictions implementing the guidelines increases every 2 years.

The preliminary criteria listed above are intended to help CDFW evaluate whether management actions are resulting in long-term conservation of the species. If they are not, it may be necessary to determine if and how the management actions should be modified or replaced.

As ongoing research develops metrics for demonstrating long-term persistence of western Joshua tree in California in the face of climate change, some effectiveness criteria may be modified or added when the Conservation Plan is reviewed and updated.





These initial effectiveness criteria help determine how successful implementing these important actions have been to conserve the species. These criteria will be used to determine if administration of the Western Joshua Tree Conservation Fund, development and execution of written interagency agreements or written MOUs with land management entities, and other actions are effective at achieving the vision, purpose, and objectives of the Conservation Plan.

### 5.4 PRIORITY MANAGEMENT ACTIONS FOR MANAGEMENT UNITS

Management units are outlined and delineated in Section 4.4 based on criteria for expected climate conditions, quality of habitat, existing management authorities, and land ownership. Organizing the landscape into management units based on these characteristics of the landscape will help guide the application of the Conservation Plan's management actions.

Although the management actions described in this chapter (which are summarized in Table 5-2 below) could apply to any management unit, certain management actions are recommended as priorities for specific management units (Table 5-3). For example, regardless of habitat conservation value, the management actions in Tribal Land units will prioritize establishing co-management principles and mutually defining elements of co-management. Some management actions could be applied throughout the species range without prioritization by management units. For example, conducting research and gathering information will help inform management in all management units in the future. Conducting education and outreach will similarly help educate the public and improve management in all management units.



**Table 5-2 Summary of Management Actions**

| Management Action Abbreviation | Management Action Title                                 |
|--------------------------------|---------------------------------------------------------|
| A&M 1                          | Avoid Direct and Indirect Impacts                       |
| A&M 2                          | Minimize Direct and Indirect Impacts                    |
| A&M 3                          | Minimize Impacts from Wildland Fire and Fire Management |
| LC&M 1                         | Identify Priority Conservation Lands                    |
| LC&M 2                         | Protect Priority Conservation Lands                     |
| LC&M 3                         | Manage Conservation Lands                               |
| LC&M 4                         | Restore and Enhance Habitat                             |
| LC&M 5                         | Establish Seed Banks and Nurseries                      |
| TCM 1                          | Establish Co-Management Principles                      |
| TCM 2                          | Mutually Define Elements of Co-Management               |
| R&I 1                          | Continue Research and Information Development           |
| E&A 1                          | Support Education and Outreach                          |

Source: Compiled by Ascent in 2024.

**Table 5-3 Priority Management Actions for Western Joshua Tree Management Units by Conservation Value Category and Predicted Climate Refugia Category**

| Management Unit Type <sup>1</sup>             | Ecologically Core and Intact                                              | Predicted Climate Refugia Category <sup>2</sup> in Ecologically Core and Intact        | Moderately Degraded and Highly Converted       | Predicted Climate Refugia Category in Moderately Degraded and Highly Converted         |
|-----------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------|
| Wilderness                                    | A&M 3 <sup>3</sup><br>LC&M 3 <sup>3</sup><br>LC&M 4 <sup>3</sup>          | A&M 3 <sup>3</sup>                                                                     | LC&M 3 <sup>3</sup><br>LC&M 5 <sup>3</sup>     | LC&M 1 <sup>4</sup><br>LC&M 3 <sup>3</sup><br>LC&M 5 <sup>3</sup>                      |
| Preservation with Light Recreation/ Other Use | A&M 1<br>A&M 2<br>A&M 3<br>LC&M 3<br>LC&M 4<br>LC&M 5                     | A&M 1<br>A&M 2<br>A&M 3                                                                | LC&M 3<br>LC&M 4<br>LC&M 5                     | LC&M 1 <sup>4</sup><br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3           |
| Defense                                       | LC&M 1<br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 | LC&M 1 <sup>4</sup><br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 | LC&M 1<br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5 | LC&M 1 <sup>4</sup><br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 |



| Management Unit Type <sup>1</sup> | Ecologically Core and Intact                                              | Predicted Climate Refugia Category <sup>2</sup> in Ecologically Core and Intact        | Moderately Degraded and Highly Converted                | Predicted Climate Refugia Category in Moderately Degraded and Highly Converted                 |
|-----------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Tribal Land                       | TCM 1<br>TCM 2<br>A&M 1<br>A&M 2<br>A&M 3<br>LC&M 3<br>LC&M 4<br>LC&M 5   | TCM 1<br>TCM 2<br>A&M 1<br>A&M 2<br>A&M 3                                              | TCM 1<br>TCM 2<br>LC&M 3<br>LC&M 4<br>LC&M 5            | TCM 1<br>TCM 2<br>LC&M 1 <sup>4</sup><br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 |
| Mixed Use                         | LC&M 1<br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 | LC&M 1 <sup>4</sup><br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 | LC&M 1<br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5          | LC&M 1 <sup>4</sup><br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3         |
| Little or No Protection           | LC&M 1<br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 | LC&M 1 <sup>4</sup><br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 | LC&M 1<br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>E&A 1 | LC&M 1 <sup>4</sup><br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3         |

<sup>1</sup> Although actions described in this chapter can be applied to any management unit, the actions listed in this table identify the highest priority management actions for each unit.

<sup>2</sup> Recommendations for the predicted climate refugia category can be applied to any unoccupied future suitable habitat category that is identified.

<sup>3</sup> Management activities on conservation lands may be allowed in wilderness areas or may be limited by the administering agency to protect wilderness values.

<sup>4</sup> If priority conservation lands are identified in the predicted climate refugia category that is present within moderately degraded or highly converted land, management should prioritize avoiding and minimizing impacts.

Source: Compiled by Ascent in 2024.

In ecologically core and intact habitat that currently have land protections (i.e., Wilderness, Preservation with Light Recreation/Other Use), avoiding and minimizing impacts should be prioritized. Because management actions in wilderness areas are limited to protecting wilderness values, coordination with BLM, USFS, and NPS will be imperative. In addition, these areas should prioritize identifying, protecting, restoring, and managing priority conservation lands (Actions LC&M 3, LC&M 4, and LC&M 5), including collecting seed when appropriate. In Tribal Land units, management should follow recommendations for Wilderness and Preservation with Light Recreation/Other Use units, as well as implementing tribal focused management actions. In ecologically core and intact habitat that do not currently have protection or have minimal land protections (i.e., Little to No Protection, Mixed Use, and



Defense), management should focus on identifying, protecting, and managing priority conservation lands and avoiding and minimizing impacts.

Although some lands are classified as ecologically core and intact habitat in the ecoregional assessment, there may be opportunities in these areas to benefit from restoration based on finer-scale and site-specific assessments for specific projects or site-scale planning decisions (Randall et al. 2010). This would be determined on a site-by-site basis.



Source: Jeb Bjerke, California Department of Fish and Wildlife.

Within the moderately degraded or highly converted habitat that have minimal to no land protections (i.e., Little to No Protection, Mixed Use, Defense units), management should focus on identifying, protecting, managing, and restoring priority conservation lands and avoiding and minimizing impacts. For the Little to No Protection units categorized as moderately degraded or highly converted habitat, education and awareness should also be

prioritized. In areas of moderately degraded or highly converted habitat that have land protections (i.e., Wilderness, Preservation with Light Recreation/Other Use), management should focus on identifying, protecting, managing, and restoring priority conservation lands and avoiding and minimizing impacts. To protect wilderness values, some actions may not be allowed or may be limited in Wilderness units by the administering agency. In Tribal Land units, management should follow recommendations for Wilderness and Preservation with Light Recreation/Other Use units, as well as implementing tribal focused management actions.

Management of land in the predicted climate refugia category within ecologically core or intact habitat that have minimal or no protections (i.e., Little to No Protection, Mixed Use, and Defense units) should prioritize identifying, protecting, managing, and restoring priority conservation lands. Management units containing land in the predicted climate refugia category in ecologically core or intact habitat with land protections (i.e., Wilderness, Preservation with Light Recreation/Other Use) should prioritize avoidance or minimizing impacts to the greatest extent feasible. In Tribal Land units, management should follow recommendations for Wilderness and Preservation with Light Recreation/Other Use units, as well as implementing tribal focused management actions.

There may be areas that are degraded but have land in the predicted climate refugia category, so it should be determined whether restoring these areas would further the conservation of the species. Management should prioritize avoiding and minimizing impacts





on any priority conservation lands within degraded areas, or priority conservation lands that contain minimal or no protections that are also within the predicted climate refugia category. The recommendations for areas in the predicted climate refugia category also apply to land within modeled climate refugia in the buffered climate refugia category and the unoccupied future suitable habitat category where western Joshua trees could naturally disperse (Shryock et al. 2025).

Within unoccupied habitat in the buffered climate refugia category that is modeled as climate refugia and the unoccupied future habitat category, as defined in Section 4.4, areas should be managed to avoid impacts and preserve functioning ecosystems so that western Joshua tree can potentially occupy them in the future. Further study is needed to test the effectiveness of assisted migration of western Joshua tree and to determine how it can be done cost effectively and without adverse effects to the receiving ecosystems. Assisted migration of western Joshua tree in areas in which the species is likely to naturally migrate and is likely to be valuable for conserving the species over the long term, as described in Action LC&M 4.4, but should be implemented carefully and should not be considered an alternative to protecting occupied climate refugia.

Opportunities for assisted migration in areas to which the species is unlikely to naturally migrate and that are currently unoccupied by western Joshua tree but would potentially be suitable for the species in the future (i.e., modeled as future climate refugia) should receive further evaluation if scientific evidence supports its feasibility and effectiveness. Assisted migration may have conservation value if questions about its effectiveness for species conservation are resolved, costs become feasible, and the owners and managers of receiving land are supportive.



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## 6 IMPLEMENTATION

### 6.1 INTRODUCTION

This chapter describes key mechanisms for Conservation Plan implementation, the roles of the implementing parties, and the ongoing implementation monitoring and adaptive management features of the Conservation Plan. Pursuant to the Western Joshua Tree Conservation Act (WJTCA), CDFW must implement the Conservation Plan in collaboration with the Commission, governmental agencies, California Native

American tribes (Tribes), and the public (Fish & G. Code, § 1927.6, subd. (a)). Elements of Conservation Plan implementation are summarized below. Details supporting some of the implementation elements are provided in the appendices to the Conservation Plan. Western Joshua tree take permitting under the WJTCA and other parts of the Fish and Game Code are also described in this chapter. Additional permitting information and guidance is available on CDFW's western Joshua tree website.

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*"During nights in the open, lying in a snug sleeping-bag, I soon learned the charm of a Joshua Forest... The desert with its elusive beauty...possessed me, and I constantly wished that I might find some way to preserve its natural beauty."*

*— Minerva Hamilton Hoyt*

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### 6.2 ROLES OF IMPLEMENTING PARTIES

#### 6.2.1 California Department of Fish and Wildlife

CDFW is responsible for developing and implementing the Conservation Plan, managing the expenditures and accounting of the Western Joshua Tree Conservation Fund (Conservation Fund), and implementing the permitting processes set forth in WJTCA. These responsibilities include the following:



- Working with collaborators to conserve western Joshua tree and to complete the management actions described in Chapter 5, “Conservation Management Actions and Effectiveness Criteria,” of the Conservation Plan.
- Expending monies from the Conservation Fund to acquire, conserve, and manage western Joshua tree conservation lands and to complete other activities to conserve western Joshua tree.
- Periodically reporting on the efficacy of management actions and other outcomes to the Commission and California State Legislature (Legislature).
- Implementing the permitting programs set forth in WJTCA in a manner that supports meeting the conservation needs of western Joshua tree.

In addition, CDFW will continue to consult with Tribes and federal, state, and local agencies to plan and implement activities consistent with western Joshua tree conservation; identify opportunities to conserve western Joshua tree on CDFW-owned lands; integrate protective measures for western Joshua tree into CDFW guidelines and regulations for public use and into land management plans; implement restoration or enhancement of western Joshua tree habitat; receive relocated western Joshua trees; and manage wildland fire risk.

## 6.2.2 California Fish and Game Commission

The Commission is responsible for review and approval of the Conservation Plan. WJTCA requires the Commission to take action on the Conservation Plan by June 30, 2025. Prior to taking action, as part of its review of the Conservation Plan, the Commission conducted a public process, which is described on the Commission’s website. As a discretionary action by a public agency that would result in changes to the physical environment, compliance with California Environmental Quality Act (CEQA) is necessary. The Commission is the lead agency under CEQA for approval of the Conservation Plan.

After initial approval, CDFW and the Commission shall, if necessary, periodically update the Conservation Plan to achieve conservation of western Joshua tree. The Commission will review the status of western Joshua tree and the effectiveness of the Conservation Plan at a public meeting beginning in 2026 and at least every 2 years thereafter. The Commission and the Legislature will receive annual reports from CDFW assessing the conservation status of western Joshua tree and overall implementation of WJTCA.

In addition, the Commission must assess the impact and effectiveness of the Conservation Plan, WJTCA, and related information when determining whether listing western Joshua tree under California Endangered Species Act (CESA) is warranted, as described in Chapter 2, “Planning Influences.”





## 6.3 COLLABORATION

A purpose of the Conservation Plan is to guide the conservation of western Joshua tree in California by focusing attention on the most urgent and important management actions informed by science including Traditional Ecological Knowledge (TEK), and principles of co-management with California Native American tribes. As outlined in Section 1.3, “Collaboration, Outreach, and Public Review,”



Source: National Park Service.

collaboration between CDFW and Tribes, public agencies, organizations, and the general public is essential for the conservation of western Joshua tree and for implementation of the Conservation Plan. Collaborators will include California Native American tribes, and may include state and federal government agencies, local jurisdictions, landowners/neighbors, nongovernmental organizations, businesses, and academic institutions. Various agencies, organizations, and others are already implementing actions that are described in, or are similar to, those described in the Conservation Plan. Identifying these existing actions; gaining the benefit of these entities' input, knowledge, and experience; and developing new written agreements will all help to achieve the vision, purpose, and objectives of the Conservation Plan. In addition to engaging with Tribes as described in Section 1.3.2, “California Native American Tribes,” and Appendix C, “Tribal Input Summary Memo,” CDFW conducted local, state, and federal agency outreach as described in Section 1.3.1, “Local, State, and Federal Government Agencies,” and sent agencies and organizations a feedback questionnaire (Appendix A, “Agency Feedback Questionnaire”). This outreach helped CDFW understand what Tribes and other agencies and organizations are already doing to conserve western Joshua tree.

Collaborators can help conserve western Joshua tree by incorporating aspects of the Conservation Plan into their existing projects, operations, and land management activities. Collaborators may also choose to implement projects designed to achieve or align with the vision of the Conservation Plan. Relationships with collaborators may be established through a written memorandum of understanding (MOU) or other agreement.

### 6.3.1 Federal Agencies

Because the majority of western Joshua trees' distribution is on land managed by federal agencies, collaboration with federal agencies will be important for achieving the purpose and vision of the Conservation Plan. As mentioned in Action LC&M 3.2, “Prioritize Management of



State and Federal Lands for Western Joshua Tree” (see also Management Action LC&M 3, “Manage Conservation Lands,” in Section 5.2.2, “Land Conservation and Management”), federal collaboration could help achieve many of the management actions described in the Conservation Plan, such as protecting western Joshua trees on federal lands, planting or relocating trees to suitable but degraded federal lands, establishing avoidance buffers, and restoring and enhancing western Joshua tree habitat. Federal agencies may also consider designating western Joshua tree as a sensitive or protected species under applicable agency policies, management plans, or regulations. A designation may facilitate the implementation of many impact avoidance and minimization actions described in the Conservation Plan.

CDFW may enter into written MOUs or other written agreements with one or more federal agencies related to the conservation and management of western Joshua tree, similar to the durability agreements described in Section 2.2.2, “Federal Listing Status.” Even in the absence of such an agreement, CDFW may collaborate with federal agencies informally through meetings, research programs, information sharing, and other ongoing management activities. CDFW consulted with federal resource and land management agencies during the development of the Conservation Plan by distributing a feedback questionnaire to discuss western Joshua tree conservation measures being undertaken on federal land. CDFW will continue to collaborate with interested federal agencies to coordinate management actions and share conservation information. The extent and type of federal lands in the Conservation Plan’s geographic focus area are described in more detail in Section 2.3.3, “Federal Land Management.” A summary of responses from potential federal agency collaborators to outreach meetings and the questionnaire is provided below:

- **US Fish and Wildlife Service (USFWS)** may recommend measures and conditions to minimize impacts to western Joshua tree when it reviews federal projects proposed on public lands, even though western Joshua tree is not currently a federally listed species. USFWS is a key partner in the USFWS interagency Joshua Tree Biological Working Group and is helping to implement management actions on federal lands. USFWS has played a key role in the development of the Conservation Plan as a research and ecological science partner, sharing with CDFW knowledge gained in its conservation activities on federal land. USFWS does not own or manage lands within the Conservation Plan geographic focus area. CDFW will prioritize the execution of a written MOU or other agreement with USFWS to document shared goals and aspirations for conservation of western Joshua tree.
- **National Park Service (NPS)** may include in its strategic plans and resource stewardship strategies, management actions designed to aid in the conservation of western Joshua tree that are identical or similar to those in Chapter 5 and Appendix D, “Avoidance and Minimization Best Management Practices and Guidelines,” of this Conservation Plan. NPS may also protect existing western Joshua trees on NPS lands, conduct comprehensive



restoration and enhancement projects, and conduct monitoring or research related to western Joshua tree. Agreeable terms could be negotiated and finalized in a conservation agreement, written MOU, or other agreement. NPS lands within the Conservation Plan geographic focus area consist of Joshua Tree National Park and Death Valley National Park.

- **Department of Defense (DOD)** may implement management actions for the protection of natural resources, including western Joshua tree. A written MOU or other agreement may be executed to coordinate actions with DOD resource managers. DOD lands within the Conservation Plan geographic focus area consist of Edwards Air Force Base, Marine Air Ground Task Force Training Command and Marine Corps Air Ground Combat Center Twentynine Palms, Marine Corps Logistics Base Barstow, National Training Center and Fort Irwin, and Naval Air Weapons Station China Lake.
- **Bureau of Land Management (BLM)** may include protections for western Joshua tree in land management plans for protecting existing trees on BLM lands, accepting relocated trees, allowing or supporting restoration efforts, and managing lands for a specific conservation focus through written durability agreements. Agreeable terms could be negotiated and finalized in a written MOU or other agreement. BLM's Bakersfield, Barstow, Bishop, Palm Springs–South Coast, and Ridgecrest field offices each administer western Joshua tree lands within the Conservation Plan geographic focus area.
- **US Forest Service (USFS)** may evaluate the addition of western Joshua tree to the species of conservation concern list for national forests within the Conservation Plan geographic focus area, implement special management considerations for western Joshua trees on USFS lands with an emphasis on climate refugia, reduce wildland fire risk in western Joshua tree habitat, establish avoidance buffers around western Joshua trees, limit western Joshua tree removal, relocate western Joshua trees when avoidance is not possible, limit ground disturbance in western Joshua tree habitat, restore degraded habitat, enhance western Joshua tree habitat (e.g., science-based assisted gene flow), host range-wide monitoring plots, and accept and manage adjacent or in-held western Joshua tree lands purchased using the Conservation Fund. Agreeable terms could be negotiated and finalized in a written MOU or other agreement. USFS lands within the Conservation Plan geographic focus area include all or portions of Angeles National Forest, Inyo National Forest, Sequoia National Forest, and San Bernardino National Forest.

In addition to these federal agency collaborators, the Mojave Desert Sentinel Landscapes Partnership's mission, as described in Section 2.3.3, includes conserving natural resources and enhancing resilience to climate change, which align with the goals of the Conservation Plan. CDFW has initiated communication with the Sentinel Landscapes Partnership in acknowledgement of these shared goals as they relate to western Joshua tree conservation and will seek collaborative opportunities to implement restoration and enhancement activities.



### 6.3.2 State Agencies

Collaboration with state agencies could help achieve many of the management actions described in the Conservation Plan, particularly on state-owned or managed lands (see Action LC&M 3.2, "Prioritize Management of State and Federal Lands for Western Joshua Tree," in Section 5.2.2). Examples of management actions that collaboration with state agencies could facilitate on state-owned lands include relocating western Joshua trees; minimizing impacts to western Joshua tree; conducting monitoring; implementing management actions; implementing habitat restoration or enhancement activities; managing wildland fire risk and acquiring conservation lands; minimizing grazing conflicts; and establishing buffers around western Joshua trees.



Source: Jessie Quinn, Ascent.

CDFW has coordinated with state resource agencies throughout the development of the Conservation Plan and will continue to collaborate on Conservation Plan updates, as needed. Potential collaboration between CDFW and other state agencies is described in more detail below and could be guided by written MOUs or other written agreements. Collaborative management actions could also be conducted through existing agency permits or management plans. Other state agencies that may collaborate on the conservation of western Joshua tree in the future include the California Conservation Corps, California Energy Commission, California High-Speed Rail Authority, California Public Utilities Commission, and California Department of Transportation.

- **California State Parks (CSP)** has been collaborating with CDFW to identify ways to implement management actions for western Joshua tree in State Park units. Examples include potentially receiving relocated western Joshua trees, when appropriate and consistent with CSP Department Operations Manual Policy 0310.4.1 on genetic integrity in revegetation and relocation efforts; hosting range-wide monitoring plots for western Joshua tree, its pollinator, and nurse plants; and receiving and managing priority conservation lands. Planning for any of these actions could be led by CSP in collaboration with CDFW and could be guided by written MOUs or other written agreements, State Park unit general plans, or applicable management plans.





- **California Department of Forestry and Fire Protection (CAL FIRE)** could implement management actions to conserve western Joshua tree together with its land management activities to protect human safety and infrastructure from wildland fires. CAL FIRE works with CDFW staff to review CAL FIRE fuel treatment projects in western Joshua tree habitat and to develop treatments that are protective of western Joshua tree and its habitat, as described Action R&I 1.15, “Develop Additional Fuel Treatment Methods” (see Section 5.2.4, “Research to Inform Long-Term Conservation”).
- **California State Lands Commission (CSLC)** could require implementation of management actions in leases of State Lands to promote the protection of western Joshua trees. CSLC, in its capacity as landowner in trust for the people of California, could also undertake measures similar to those of CSP, such as limiting impacts to western Joshua trees, implementing habitat restoration activities, managing wildland fire risk, establishing buffers around western Joshua trees, and accepting relocated western Joshua trees on CSLC lands.

### 6.3.3 Local Agencies

Collaboration with local agencies, such as cities, counties, and special districts, could help implement Conservation Plan management actions. Local agencies can adopt policies and ordinances for avoidance and minimization of impacts through land use planning and efficient permitting processes. In addition, Regional Conservation Investment Strategies (RCISs) and Natural Community Conservation Plans (NCCPs) can include actions to conserve the species. Local agencies can also identify tree relocation receiver sites, monitor western Joshua tree populations, and conduct education and outreach for landowners and the public.

CDFW consulted with local agencies in the development of the Conservation Plan and will continue to collaborate with local agencies to implement the Conservation Plan and incorporate new or updated information, adjusted management actions, fees, or permitting processes into Conservation Plan amendments. CDFW continues to welcome feedback from the agencies on issues, successes, and ideas for improving western Joshua tree conservation efforts. CDFW will also seek feedback on aspects of the permitting process and written delegation agreements, ways to foster public awareness and engagement in western Joshua tree conservation in their communities, and creative solutions for specific projects to promote consistency with the conservation of western Joshua tree and WJTCA. In addition, counties and cities may adopt and enforce plans, policies, or ordinances that require, as a condition of approving a project, more protective measures for western Joshua tree conservation than those described in the Conservation Plan (Fish & G. Code, § 1927.11). Local agencies may also conserve western Joshua tree within their jurisdictions, such as by enacting additional local ordinances (e.g., western Joshua tree preservation ordinance), establishing county or city general plan policies (e.g., avoid or minimize impacts on western Joshua tree), preserving



trees within protected open space, and developing other conservation initiatives related to protection of western Joshua tree. Delegation of western Joshua tree take permitting authority to local governments per WJTCA (Fish & G. Code, §1927.3, subd. (c)) is described further in Section 6.5.1 below.

### 6.3.4 Public

#### GENERAL PUBLIC, UTILITIES, AND BUSINESSES

The public plays an important role in the protection of western Joshua tree. Private landowners, utilities, and businesses can protect existing trees on private lands through avoidance and minimization of impacts, beneficial land use practices, planting trees on their lands, and accepting relocated trees. Landowners may also protect in perpetuity western Joshua tree populations and habitats on their lands by recording conservation easements. The public may also organize or participate in volunteer opportunities that support conservation, research, and monitoring (e.g., local tree counts), as discussed in Section 5.2.5, “Education and Awareness.”

Utilities, other businesses (e.g., energy companies, land developers), and private mitigation bank operators can implement business-oriented or voluntary actions for conservation of western Joshua tree. There are currently two CDFW-approved, privately owned mitigation banks that have created western Joshua tree credits for purchase. Mitigation banks protect habitat for the species in perpetuity, often through a conservation easement. Additional western Joshua tree mitigation banks, ideally within climate refugia or buffered climate refugia, are in process and may be approved in the future. The purchase of approved mitigation credits is one option for mitigating take of western Joshua tree.

#### NONGOVERNMENTAL ORGANIZATIONS

Nongovernmental organizations (NGOs), such as land conservancies, nonprofit conservation organizations, and land trusts, may voluntarily protect existing trees or plant trees on their lands. The Conservation Fund is a potential source of funding for these types of NGO activities (see Section 6.6 below for more detail). Examples of NGOs that currently play a role in western Joshua tree conservation, or may in the future, are National Fish and Wildlife Foundation (NFWF), through administration of the Conservation Fund; Center for Biological Diversity, which petitioned the species for listing under CESA; and Native American Land Conservancy, Mojave Desert Land Trust, and Transition Habitat Conservancy, through land acquisition and stewardship, public outreach, and seed banking. The Mojave Desert Land Trust has also received grant funding from the Wildlife Conservation Board to convene interested parties including, but not limited to, public agencies, Tribes, academic research



partners, and nongovernmental conservation organizations. The Mojave Desert Land Trust is leading the development of a Joshua Tree Conservation Coalition to provide input to inform Joshua tree conservation efforts.

### RESEARCHERS

Organizations and agencies currently conducting research related to western Joshua tree include, but are not limited to, US Geological Survey; NPS; BLM; CSP; California State Parks Foundation; Mojave Desert Land Trust; Transition Habitat Conservancy; Willamette University; California State University, Northridge; University of California, Riverside; University of California, Santa Cruz; and Reed College. CDFW can help identify and support priority research efforts by working with universities, the USFWS-led Joshua Tree Biological Working Group of land management agency scientists, the Joshua Tree Conservation Coalition, and other research-oriented groups. CDFW can also help identify and support funding opportunities through CDFW and other agency grant opportunities.

## 6.4 TRIBAL CO-MANAGEMENT



The type of written agreements CDFW and California Native American tribes may co-develop and implement include written MOUs, memoranda of agreement, commitment letters, and conservation agreements. An example of a successful conservation strategy implemented through tribal co-management is an agreement between CDFW and the Winnemem Wintu Tribe in Northern California to fund co-

management for restoration of the winter-run Chinook salmon population in the McCloud River Watershed (CDFW and Winnemem Wintu Tribe 2023). The agreement, which acknowledged the Tribe as a co-equal decision-maker with CDFW and the National Marine Fisheries Service, laid the foundation for the Tribe to apply its Traditional Ecological Knowledge and practical understanding of the species to specific management actions for its recovery. The co-management allowed the agencies to "...expand and accelerate our efforts to restore and recover Chinook salmon" (Cathy Marcinkevage, assistant regional administrator for National Oceanic and Atmospheric Association Fisheries West Coast Region) (Traverso 2023).

As an example of a coalition of Native American tribes establishing a co-management agreement with agencies, the Hopi, Navajo, Uintah and Ouray Ute, Ute Mountain Ute, and



Zuni tribes formed the Bears Ears Inter-Tribal Coalition to propose the creation of Bears Ears National Monument in Utah in 2015. The proposal included a legal basis and implementation strategy for collaborative management between the coalition, BLM, and USFS, leading to the development of an intergovernmental cooperative agreement (Bears Ears National Monument Cooperative Agreement 2022). The cooperative agreement established commitments to cooperative planning and program development, regularly scheduled meetings and agendas, confidentiality and protection guidelines for sensitive tribal information, and involvement of the coalition in land management, among other initiatives. Under the agreement, the Native American tribes in the Bears Ears Inter-Tribal Coalition advanced their own National Environmental Policy Act (NEPA) alternative for the Bears Ears National Monument Draft EIS and co-created the proposed Resources Management Plan, both of which were released to the public in March 2024.

The following provides additional examples of tribal co-management implementation.

- Establish programs and facilities that allow tribal members to engage in co-management. This could include establishment of a Tribe-led conservation corps, training for tribal members to become arborists and co-managers with CDFW in maintaining and monitoring existing and relocated western Joshua trees, and support for tribal facilities related to western Joshua tree conservation (e.g., nurseries or restoration work facilities) on tribal lands.
- Establish opportunities for ongoing collaboration and information sharing between CDFW and California Native American tribes while respecting Tribes' right to safeguard their traditional knowledge and cultural identities. Establish preferences in how information is shared between CDFW and Tribes for effective communication and respecting capacity of partners.
- Establish written agreements to notify Tribes of opportunities for western Joshua tree relocations.
- Mutually develop and document tribal and CDFW conflict resolution processes.
- Seek out and apply for grants to support the tribal co-management process, which would include compensation for participation in this process.
- Use available funding sources to support tribal co-management implementation.
- Clearly articulate the level of measurable support (e.g., capacity, time, expertise needed) for specific actions (e.g., grant application, accessibility) that CDFW can provide California Native American tribes to support implementation of co-management and provide said level of support.





## 6.5 PERMITTING AND REGULATIONS

WJTCA provides a framework for authorizing take of western Joshua tree through the issuance of permits (Fish & G. Code, § 1927.3, subd. (a)). Pursuant to this framework, permittees may elect to pay fees in lieu of completing mitigation obligations. These fees are deposited into the Conservation Fund, which is the primary source of funds available to CDFW for implementation of the management actions in the Conservation Plan. This permitting process is authorized by WJTCA, not by the Conservation Plan. It is nevertheless described below as an important component of both western Joshua tree conservation and the provision of renewable energy and housing.

Other permitting avenues outside of the WJTCA framework are available for incidental take of western Joshua tree and are outlined below. The decision for the type of permit to pursue is the choice of the applicant based on individual project needs.

Each permit for take of western Joshua tree that is incidental to an otherwise lawful activity includes conditions and requirements that must be met for avoidance, minimization, and mitigation of impacts to western Joshua tree. These permit conditions are tailored to each project and are developed in consideration of available information regarding the efficacy of measures for the protection of the species (see Section 5.3, "Effectiveness Criteria"). The relocation protocol for western Joshua tree is provided in Appendix E, "Relocation Guidelines and Protocols." The various types of permits that may be issued for take of western Joshua tree are described below.

### 6.5.1 WJTCA Permitting

#### INCIDENTAL TAKE PERMITS ISSUED UNDER FISH AND GAME CODE SECTION 1927.3

Take of western Joshua tree may be authorized pursuant to WJTCA (Fish & G. Code, § 1927.3, subd. (a)). A WJTCA incidental take permit (ITP) may be issued when an applicant wishes to remove, trim, relocate, or work within the applicable avoidance buffer of one or more western Joshua trees for the purpose of completing a project. The applicant pays statutorily prescribed in-lieu fees to the Conservation Fund to mitigate and must also avoid and minimize take and impacts to western Joshua tree to the maximum extent practicable (Fish & G. Code, § 1927.3, subd. (a)(2)). The in-lieu fee amount is based on the location, number, and size classes of trees to be taken and is paid prior to CDFW issuing the ITP. Reduced fees are available for impacts to western Joshua trees in areas designated by WJTCA (Fish & G. Code, § 1927.3, subds. (d)(1)(A) and (B)). A map of the reduced fee area will be maintained on CDFW's Western Joshua Tree Conservation Permitting website (CDFW n.d.).



WJTCA ITP applications must include a description of the project, quantification of impacts to western Joshua tree, and a description of CEQA compliance for the project. ITPs issued under WJTCA must include a census of western Joshua trees on the project site with size-class information for and photographs of each individual tree. Project-specific permit conditions are included in a WJTCA ITP and could include avoidance and minimization measures, such as relocation of western Joshua tree, avoidance buffers, seed collection, limits on pesticide use, and use of desert native plant specialists, as defined in Section 5.2.1, "Impact Avoidance and Minimization," as well as monitoring and reporting. The permittee is responsible for following the relocation protocol for western Joshua tree provided in Appendix E and implementing measures to ensure the survival of the relocated western Joshua trees. Landowners that agree to allow western Joshua trees to be relocated onto land they own will not be liable for survival of the relocated trees or changes to land use practices unless specified in written agreement with the permittee (Fish & G. Code, § 1927.3, subds. (g)(1) and (2)).

### HAZARD MANAGEMENT PERMITS ISSUED UNDER FISH AND GAME CODE SECTION 1927.4

Under WJTCA, CDFW may also issue permits to authorize the removal or trimming of dead western Joshua trees or the trimming of live western Joshua trees, provided certain conditions are met (Fish & G. Code, § 1927.4). Pursuant to these permits, property owners and their agents may remove detached dead western Joshua trees and detached limbs of western Joshua tree, whereas all other removals or trimmings (i.e., attached trees or limbs) must be completed by a desert native plant specialist. Trimming of a live western Joshua tree pursuant to a hazard management permit cannot result in the death of the tree (e.g., trimming a tree so that no live branches remain).



*Western Joshua trees create hazards by falling on power lines or structures.*



CDFW may issue hazard management permits without requiring the payment of fees or other mitigation, provided that the dead western Joshua trees and any limbs to be removed have fallen over and are within 30 feet of a structure, are leaning against an existing structure, or create an imminent threat to public health or safety.

For the purposes of Fish and Game Code section 1927.4, a western Joshua tree must meet at least one of the following criteria to be considered dead:

- Has not burned and has no green leaves, no new growth on the main stem, and no basal sprouts.
- Has partially or fully burned at least 18 months prior and otherwise meets the above-listed criteria.
- Has fallen and is completely detached from its roots or has fallen and its roots are no longer in contact with the soil.

### **INCIDENTAL TAKE AND HAZARD PERMITS ISSUED BY COUNTIES AND CITIES PURSUANT TO DELEGATION AGREEMENTS**

WJTCA allows CDFW to enter into an agreement with any county or city to delegate the ability to authorize, by permit, the taking of a western Joshua tree associated with developing single-family residences, multifamily residences, accessory structures, and public works projects, provided certain conditions are met (Fish & G. Code, § 1927.3, subd. (c)). Section 1927.3, subdivision (c)(3) of the Fish and Game Code specifies limits on the number of individual western Joshua trees that a project may take pursuant to a permit issued under a county's or city's delegated authority, depending on the project type, and requires CDFW's concurrence that certain projects have avoided and minimized the take of western Joshua trees to the maximum extent practicable. To receive this limited delegation of authority, a county or city must adopt an ordinance requiring the satisfaction of all requirements in section 1927.3 as a condition of approval for any take permit issued under such authority (Fish & G. Code, § 1927.3, subd. (c)(1)).

WJTCA ITPs may be issued by a county or city under a delegation agreement if the applicant is seeking take authorization for a maximum of 10 trees for a multifamily, single-family, or accessory structure project or for a maximum of 40 trees for a public works project, within the county's or city's jurisdiction. CDFW's written concurrence is needed prior to authorizing the take of more than 20, but no more than 40, individual western Joshua trees for a public works project. Delegation agreements must include the following conditions:

- The county or city must adopt an ordinance that mandates, as a condition of any WJTCA ITP issued by the county or city, satisfaction of the requirements of WJTCA.



- The county or city collects in-lieu fees for permits issued and remits them quarterly for deposit into the Conservation Fund.
- The county or city may impose a reasonable fee to cover the administrative costs of issuing the permit.
- CDFW retains express authority to suspend or revoke the county's or city's delegated authority to issue WJTCA ITPs.
- The county or city will submit quarterly reports to CDFW documenting the number of permits issued under this authority, photographs and other evidence demonstrating that take and other impacts were avoided and minimized to the maximum extent practicable, the number and size class of western Joshua trees authorized to be taken, the number of western Joshua trees relocated, the amount of fees collected, and other information required by CDFW.
- The county or city will conduct annual assessments, pursuant to guidance developed by CDFW, of the status of the local western Joshua tree population within the county or city and will submit the assessments to CDFW.

CDFW may also enter into an agreement with any county or city to delegate the ability to authorize, by permit, the removal or trimming of dead western Joshua trees or the trimming of live western Joshua trees that pose a risk to structures or public health and safety, provided certain conditions are met (Fish & G. Code, § 1927.4, subd. (b)). To receive this limited delegation of authority, counties and cities must ensure the requirements of Fish and Game Code section 1927.4, subdivision (a) are met and must comply with specific reporting requirements (Fish & G. Code, § 1927.4, subd. (b)).

## 6.5.2 California Endangered Species Act Permitting

### SCIENTIFIC, EDUCATIONAL, AND MANAGEMENT PERMITS ISSUED UNDER FISH AND GAME CODE SECTION 2081, SUBDIVISION (a)

CDFW may, through permits or written MOUs, authorize import, export, take, or possession of species protected under CESA, including candidate species, such as western Joshua tree, for scientific, educational, or management purposes pursuant to Fish and Game Code section 2081, subdivision (a). These permits may also be issued to California Native American tribes for certain cultural purposes. CDFW may issue these permits for research and recovery actions for state-listed plant species, including seed banking, reintroduction efforts, and habitat restoration projects.





## **INCIDENTAL TAKE PERMITS ISSUED UNDER FISH AND GAME CODE SECTION 2081, SUBDIVISION (b)**

Authorization for take of state-listed or candidate species can also be obtained through a Fish and Game Code section 2081, subdivision (b) permit, commonly referred to as a “CESA Incidental Take Permit or ITP.” These permits may be issued to applicants whose projects will take state-listed or candidate species, including western Joshua trees that need to be removed, trimmed, or relocated incidentally to the purpose of completing a project. Such take must be incidental to an otherwise lawful activity, rather than the purpose of the project. These permits are most commonly issued for residential and renewable energy development, utility, transportation, and other infrastructure-related projects.

CDFW may only issue a CESA ITP if (1) the take is incidental to an otherwise lawful activity; (2) the impacts of the authorized take are minimized and fully mitigated; (3) the applicant ensures adequate funding to implement the permit measures, monitor compliance with those measures, and monitor the effectiveness of the measures; and (4) issuance of the permit will not jeopardize the continued existence of the species. The “fully mitigated” standard may be met through the purchase of conservation bank credits (when available) or through the conservation of habitat management lands. Minimization measures could include, but are not limited to, tree relocation, seed collection, limits on pesticide use, use of designated biologists, and reporting.

### **6.5.3 Natural Community Conservation Planning Act**

As discussed in Section 2.3.1, “Natural Community Conservation Planning Program,” NCCPs provide a framework to protect, enhance, and restore the natural resources in a specific area while streamlining incidental take permitting for CESA-listed and other covered species for activities covered under the NCCP. Priority conservation and mitigation areas are identified during plan development, prior to impacts occurring. Mitigation for activities covered under an NCCP is typically achieved through establishment of habitat reserves. Working with landowners, environmental organizations, and other interested parties, an implementing agency is responsible for implementing activities under an NCCP. CDFW is the state agency overseeing the NCCP program.

### **6.5.4 Restoration Management Permit Act**

The Restoration Management Permit Act (Fish & G. Code, § 1670 et seq.) was enacted in September 2024 (AB 1581, Statutes of 2024). It authorizes CDFW to issue a Restoration Management Permit to allow the take, possession, import, or export of any species or subspecies of fish, wildlife, or plants, including western Joshua tree, in association with a



management or propagation project that, among other things, has the primary purpose of restoring native fish, wildlife, plants, or their habitat. A qualifying project must also result in a substantial net benefit to native fish, wildlife, or plants, or their habitats.

## 6.6 CONSERVATION FUND AND IN-LIEU FEES

### 6.6.1 Conservation Fund

Pursuant to WJTCA, monies in the Conservation Fund are continuously appropriated to CDFW for the purpose of acquiring, conserving, and managing western Joshua tree conservation lands and completing other activities to conserve the species (Fish & G. Code, § 1927.5). Expenditures from the Conservation Fund may include but are not limited to, land acquisition or conservation easement costs, monitoring costs, restoration costs, transaction costs, and costs of endowments for land management or easement stewardship. All fees remitted to CDFW in lieu of completing mitigation activities under WJTCA ITPs will be deposited into the Conservation Fund. The WJTCA (Fish and Game Code 1927.5(c)) allows the Conservation Fund to receive other funding to support the conservation of the western Joshua tree. This other funding may come in as fines, penalties, or fees associated with unauthorized impacts to western Joshua tree or western Joshua tree habitat as well as voluntary monetary donations.

CDFW will oversee all expenditures from the Conservation Fund and ensure funding is only allocated to eligible activities and entities. CDFW will prioritize expenditures and mitigation activities on properties with the highest conservation value to western Joshua tree, determined using a model-based land prioritization framework and mapping tool developed primarily by CDFW and NFWF. The tool will evaluate land conservation opportunities by assigning weighted values to criteria discussed in Section 5.2.2, Action LC&M 1, "Identify Priority Conservation Lands." Once CDFW has determined a proposed expenditure is eligible for monies from the Conservation Fund, NFWF, as the administrator of the Conservation Fund, will enter into a funding agreement with the entity receiving the monies. The funding agreement will require regular reporting on monies spent.

Annual reporting on the in-lieu fee program and status of mitigation activities funded with monies from the Conservation Fund, includes the number, location, and quality of the acres conserved; the amount of fees paid; the amount of all expenditures from the Conservation Fund; the projects and actions funded by expenditures from the Conservation Fund; and the adequacy of the in-lieu fees to conserve western Joshua tree. Reports will be submitted to the Commission and the Legislature for review, and once approved, will be posted on CDFW's website.



### 6.6.2 In-lieu Fees

Under WJTCA, a permittee may pay a fee to take each individual tree based on the size of tree in lieu of completing mitigation obligations on its own. As a result, the total fees assessed for a project increase with the number and size of trees taken. WJTCA also established a two-tier fee structure, where per-tree in-lieu fees are nominally larger within a specified geographic area.

WJTCA requires annual adjustments of in-lieu fees for the issuance of WJTCA ITPs (Fish & G. Code, § 1927.8, subd. (b)). Fees must be annually adjusted using the implicit price deflator, which is a price index that measures changes in the prices of goods and services produced in the United States. In addition, by December 31, 2026, and every 3 years thereafter, CDFW is required to adopt and subsequently amend regulations adjusting the in-lieu fees imposed under WJTCA as necessary to ensure the conservation of the species. CDFW will use total cost accounting when determining the adequacy of the fees for ensuring conservation of the species. Total cost accounting is a method of calculating not just direct costs, but also indirect and overhead costs associated with providing a service over the life of the service to allow a more accurate view of the service's full costs and efficiency. In the case of the Conservation Fund, evaluation of costs includes "ensuring sufficient funds for land acquisition or conservation easement costs, monitoring costs, restoration costs, transaction costs, and the amount of endowments for land management or easement stewardship costs" for long-term management necessary to conserve western Joshua tree (Fish & G. Code, § 1927.8, subd. (b)).

CDFW acknowledges that in-lieu fees may disproportionately affect low-income residents and single-family homeowners, an issue CDFW is seeking to help address.

## 6.7 LAND ACQUISITION PROTOCOLS

WJTCA requires CDFW to prioritize actions and the acquisition and management of lands as appropriate for western Joshua tree conservation (Fish & G. Code, § 1927.6, subd. (c)). Land acquisitions will occur in stages so CDFW can approve each stage before the land acquisition moves forward. CDFW will identify western Joshua tree lands that are available from willing sellers for fee title or conservation easement acquisition (Fish & G. Code, § 1927.6, subd. (d)(1)). Lands meeting the criteria listed in Section 5.2.2 will be prioritized for acquisition. Fee title and conservation easement acquisitions will only occur from willing sellers.

If CDFW determines land proposed for acquisition or conservation contains habitat for western Joshua tree, then reports, including preliminary title reports, a Phase I environmental site assessment report, and a mineral risk opinion, will be prepared or obtained to allow CDFW to identify any issues with the property (e.g., easements, access, litigation, liens, leases, mineral rights) and any potential conflicts with conservation goals, as described in Chapter 5.



If CDFW determines land is eligible for acquisition or protection, CDFW will work with the landowner to prepare a lands package consisting of real estate documents and land surveyor products (e.g., boundary, improvements or encumbrances maps, deed, preliminary title report). For lands requiring conservation easement acquisitions, CDFW will evaluate and approve an easement holder (grantee), land manager, and endowment holder to ensure compliance with Civil Code sections 815–816 and Government Code sections 65965–65968.



Source: Bill Bjornstad, National Park Service.

In the final stage of the land acquisition process, the real estate transaction will be completed (e.g., coordinate escrow, title, closing). The transaction will be funded with monies from the Conservation Fund, as directed by CDFW.

If the conservation easement or land acquisition includes restoration, enhancement, translocation, interim management, long-term land management, or monitoring, CDFW must review and approve a plan outlining these activities to ensure they are completed. For western Joshua tree habitat that is already legally protected and would benefit from enhancement, restoration, management, or monitoring, CDFW will review potential enhancement and restoration projects for those lands, in accordance with the process shown in the CDFW Western Joshua Tree Conservation Act Enhancement and Restoration Projects Assessment (see Appendix H, “Enhancement and Restoration Prioritization Assessment”).

Long-term management and monitoring will be funded through the Conservation Fund, as directed by CDFW (see Appendix I, “Land Acquisition Flow Chart”).





## 6.8 MONITORING, SPECIES STATUS REVIEWS, PLAN AMENDMENT, AND ADAPTIVE MANAGEMENT

As mentioned in Section 1.5, “Western Joshua Tree Conservation Adaptive Management Framework,” and consistent with WJTCA, the Conservation Plan is designed to be a living document to be updated and amended at regular intervals, as needed (Fish & G. Code, § 1927.8). As conditions evolve, this document may be amended to respond to changes and incorporate new information so that it can continue to provide effective guidance. The framework for monitoring, reviews, amendments, and adaptive management is described below.

### 6.8.1 Monitoring and Reporting

#### MONITORING

Monitoring the effectiveness criteria, as detailed in Section 5.3, is essential to evaluate whether management actions are achieving their desired result over time, and if not, to determine if and how the measures should be modified. This will involve collection of western Joshua tree data to monitor and assess the species’ population status. CDFW will also evaluate metrics that measure the effectiveness of the management actions and assist with developing new or more refined effectiveness criteria as new information (e.g., biological data collected as a result of Management Action R&I 1, “Continue Research and Information Development” [see Section 5.2.4]) is gathered.

#### ANNUAL REPORTING

CDFW is required by WJTCA (Fish & G. Code, § 1927.7, subd. (a)) to provide annual reports to the Commission and the Legislature. These annual reports will document metrics related to the performance of the permitting and mitigation framework included in WJTCA and described above in Section 6.5, as well as metrics related to the conservation status of western Joshua tree, including the following information:

- Number of permits and the size-class and number of trees taken.
- Number and location of trees relocated.
- Acreage and location of Joshua tree woodland (dominated by western Joshua tree) developed.
- Type, scope, and scale of mitigation measures undertaken by permittees.
- Acreage, quality, and location of Joshua tree woodland (dominated by western Joshua tree) conserved.



- The amount of fees paid, the amount of all expenditures from the Conservation Fund, and the adequacy of the fees to conserve western Joshua tree.
- A summary of the information provided by counties and cities pursuant to written delegation agreements.

Data from annual reporting can be used to evaluate how mitigation is compensating for permitted take of western Joshua trees, participation and compliance levels with permit conditions and written delegation agreements, and progress toward reaching conservation goals.

### 6.8.2 Species Status Review

CDFW will prepare an updated status review report for western Joshua tree and submit it to the Commission no later than January 1, 2033. The Commission will then determine whether western Joshua tree should be listed as endangered or threatened pursuant to CESA. The status review report will incorporate scientific information relevant to the status of the species developed or acquired by CDFW after it conducted the last status review in 2022. The report will also include an evaluation of the effectiveness of the conservation and management efforts to date (Fish & G. Code, § 1927.9). In determining whether listing western Joshua tree under CESA is warranted, the Commission will consider all the following:

- The effectiveness of conservation measures for western Joshua tree funded through expenditures of in-lieu fees.
- The Conservation Plan.
- Annual reports submitted to the Commission since adoption of the Conservation Plan.
- Any recommendations submitted by CDFW to the Commission for western Joshua tree.
- Fee adjustments, if any.
- The updated status review report described above (Fish & G. Code, § 1927.2, subd. (c)) (see Chapter 5 for more detail).

### 6.8.3 Plan Amendments and Adaptive Management

In accordance with WJTCA, starting in 2026 and at least every 2 years thereafter, the Commission will review the effectiveness of the Conservation Plan in conserving the species (Fish & G. Code, § 1927.8). CDFW will make recommendations to the Commission concurrent with the Commission's review of the status of western Joshua tree. As part of this review, CDFW will recommend proposed amendments to the Conservation Plan, if needed. Any Conservation Plan amendments must be reviewed and adopted by the Commission.



CDFW developed the Conservation Plan based on the best available information at the time of preparation, consisting of "credible science" as defined in the California Fish and Game Code section 33; TEK; collaboration with Tribes; collaboration with federal, state, and local government agencies; and public feedback. New information from ongoing research, monitoring, and other sources will become available over time, and adjustments will be required to keep the Conservation Plan up to date. Data will be collected at various scales, from site-specific to range-wide within California. As described in Chapter 1, "Introduction," an adaptive management approach allows for implementing management actions, closely monitoring and evaluating outcomes of management, and reevaluating and adjusting decisions as more information is learned. The Conservation Plan anticipates that CDFW, in collaboration with Tribes, governmental agencies, and other entities, will continue to monitor the outcomes of management actions and will adjust future actions accordingly. CDFW will also continue to seek input from the general public regarding implementation of the Conservation Plan and its effectiveness in conserving western Joshua tree.



Source: Alessandra Puig-Santana, National Park Service.



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# 7 PLAN PREPARERS

The Western Joshua Tree Conservation Plan was prepared through the collaborative efforts of staff listed below from the California Department of Fish and Wildlife, the Native American Land Conservancy, Ascent Environmental, Inc. dba Ascent, ASM Affiliates, Piñon Heritage Solutions, and California Native American tribes listed in Chapter 3, Section 3.1 “California Native American Tribes Collaborating on the Conservation Plan” and Appendix C, “Tribal Input Summary Memo.”

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## 8 GLOSSARY OF TERMS

### A

**abiotic factors.** Nonliving parts of an ecosystem.

**acquisition.** The term “acquisition” as used in the Western Joshua Tree Conservation Plan (Conservation Plan) is the process of obtaining land dedicated to a specific use or uses by purchase, exchange, donation, or condemnation.

**adaptive genetic variation.** Genetic variation within a species that allows it to adapt to changes in environmental conditions.

**adaptive management.** A structured process that allows for implementing management actions, that is based on closely monitoring and evaluating outcomes, and reevaluating and adjusting decisions as more information is learned.

**arbuscular mycorrhizal fungi.** Soil microorganisms that can form mutualistic relationships with most terrestrial plants.

**assisted migration.** Human-assisted movement of species in response to climate change.

### B

**bajadas.** A broad slope of alluvial material at the foot of an escarpment or mountain.

**basal sprouts.** New vegetative growth that sprouts from buds on the base of a tree.

**biological soil crusts.** Soil surface layers that include bacteria, cyanobacteria, algae, mosses, liverworts, fungi, or lichens and that can be major components of undisturbed desert ecosystems. These are also known as “biotic soil crusts” or “biocrusts.”

**biotic factors.** Living parts of an ecosystem.



## C

**California Native American tribes.** Collective reference to federally recognized Native American tribes and any non-federally recognized tribes located in California that are on the contact list maintained by the California Native American Heritage Commission for the purposes of cultural resources assessment and protection.

**candidate species.** A native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the California Fish and Game Commission (Commission) has formally noticed as being under review by the California Department of Fish and Wildlife (CDFW) for addition to either the list of endangered species or the list of threatened species, or a species for which the Commission has published a notice of proposed regulation to add the species to either list (Fish & G. Code, § 2068).

**climate refugia.** Areas that remain relatively buffered from contemporary climate change over time enabling persistence of valued physical, ecological, and sociocultural resources.

**conservation easement.** A legal agreement that protects land by permanently limiting some uses that would compromise the conservation values of the property.

**Conservation Fund.** The Western Joshua Tree Conservation Fund as described in Section 1927.5 (Fish & G. Code, § 1927.1, subd. (g)), which states in part, that any moneys in the fund are continuously appropriated to the department solely for the purposes of acquiring, conserving, and managing western Joshua tree conservation lands and completing other activities to conserve the western Joshua tree (Fish & G. Code, § 1927.5, subd. (a)).

**conservation land.** Land that is identified as appropriate for western Joshua tree conservation by CDFW.

**conserve.** The terms “conserve” and “conservation” as stated in WJTCA and used in this Conservation Plan apply to the use of methods and procedures that are necessary to bring species listed pursuant to the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.) to the point at which the measures provided pursuant to CESA are no longer necessary, and for species that are not listed to maintain or enhance the condition of the species so that listing will not become necessary (Fish & G. Code, § 1927.1, subd. (c)).

## D

**dead western Joshua tree.** a dead western Joshua tree is one that meets at least one of the following criteria: (1) has not burned and has no green leaves, no new growth on the main stem, and no basal sprouts; (2) has partially or fully burned at least 18 months prior and





otherwise satisfies criteria 1; (3) has fallen and is completely detached from its roots or has fallen, and its roots are no longer in contact with the soil (Fish & G. Code, § 1927.1, subd. (d))).

**delegation agreements.** An agreement with any city or county delegating to the local agency the ability to authorize take of western Joshua tree associated with developing single-family residences, multifamily residences, accessory structures, and public works projects or to authorize the removal or trimming of dead western Joshua trees or trimming of live western Joshua trees that have fallen over and are within 30 feet of a structure, are leaning against an existing structure, or creating an imminent threat to public health or safety (Fish & G. Code, §§ 1927.3, subd. (c), 1927.4, subd. (b)).

**desert native plant specialist.** An arborist certified by the International Society of Arborists, or an individual with at least 5 years of professional experience with relocation or restoration of native California desert vegetation (Fish & G. Code, § 1927.1, subd. (e)).

**direct effects.** Actions or changes in an organism's environment that occur as a direct result of human activity and that have a physical effect on the organism. Examples may include dust from equipment landing on leaves; damage to stems, roots, or seeds; or killing and removal of trees.

**distribution.** The actual sites where individuals and populations of the species occur within the species' range. It is often impossible to have the perfect knowledge necessary to know the true distribution of individuals of a species, and this term is therefore often used conceptually.

## E

**ecoregion.** Ecoregions are delineated based on associations of biotic factors (i.e., living parts of an ecosystem) and environmental factors that affect energy, moisture, and nutrient gradients, which regulate the structure and function of ecosystems, and environmental factors, including climate, physiography, water, soils, air, hydrology, and potential natural communities.

**endangered species.** A native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease (Fish & G. Code, § 2062).

**endowment.** Financial assets that are structured so the initial amount invested (i.e., the principal, capital, or corpus) remains intact, and only the interest or investment gains are withdrawn.



**enhancement.** Habitat enhancement involves the modification of certain characteristics of a site with the goal of increasing specific habitat functions based on management objectives, such as increasing habitat suitability for a particular species.

**environmental justice.** The fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies (Gov. Code § 65040.12, subd. (e)).

## F

**fee.** The elective fee described in subdivisions (d) and (e) of Section 1927.3, which is to be deposited into the Western Joshua Tree Conservation Fund (Fish & G. Code, § 1927.1, subd. (f)).

**fire return interval.** Time between fires.

## G

**generation length.** Time from seedling establishment to reproductive maturity.

**geographic focus area.** The general location of current and potential future suitable western Joshua tree habitat referenced in the Western Joshua Tree Conservation Plan.

## H

**habitat.** An area that provides the necessary resources for a species or population to survive and reproduce. Habitat for a species may be occupied or unoccupied by the species.

**herbivory.** The consumption of plant material by animals. Herbivory is a key ecosystem process that reduces biomass and density of plants or plant materials, transfers mass and nutrients to the soil or water column, and affects habitat and resource conditions for other organisms.

## I

**implicit price deflator.** The ratio of current dollar value of a series, such as gross domestic product (GDP), to a constant dollar value. It is used as a measure of inflation.

**in-lieu fee.** A payment of a specified fee by a project proponent to an agency in place of implementing mitigation for environmental impacts.

**indirect effects.** Actions or changes in an organism's environment that occur as an indirect result of human activity and that do not necessarily have an immediate physical effect on the organism. Examples may include changes in hydrology from human activities elsewhere, removal of unoccupied habitat, spread of invasive species or creation of conditions that are



favorable for their spread, pollution, greenhouse gas emissions, or effects to other organisms on which a species relies.

**inflorescence.** Group or cluster of flowers on one main stem on a plant.

## J

**Joshua tree.** Western Joshua tree (*Yucca brevifolia*) or eastern Joshua tree (*Yucca jaegeriana*). This term shall be used to mean both western Joshua tree and eastern Joshua tree collectively, or it may be used when the information presented is not known to be specific to one of the two species.

## K

xxx

## L

xxx

## M

**masting.** Mast seeding is the intermittent production of many seeds by many individuals of a species at the same time in the same region.

**memorandum of understanding.** A memorandum of understanding (MOU) is an agreement between two or more parties/institutions/governments. MOUs serve to document each collaborator's expectations or intentions.

**mutualism.** An ecological relationship in which two different species benefit one another.

## N

**natural community conservation plan.** A plan that identifies and provides for the measures necessary to conserve and manage natural biological diversity within the plan area while allowing compatible and appropriate economic development, growth, and other human uses (Fish & G. Code, § 2805, subd. (h)).

**nurse plant.** A plant that facilitates the growth and development of other plant species beneath its canopy.

## O

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## P

**pollinator.** An animal that moves pollen from the anther (male part) of one flower to the stamen (female part) of another flower to allow fertilization and seed and fruit production.

**population resiliency.** A population's ability to recover from impacts.

**public works project.** A project involving the erection, construction, alteration, repair, or improvement of any public structure, building, road, or other public improvement of any kind. (Fish & G. Code, § 1927.1, subd. (i)).

**prescribed herbivory.** Intentional use of domestic livestock to remove, rearrange, or convert vegetation.

## Q

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## R

**range.** The general geographic area in which individuals of a species occur during their lifetime. For purposes of this Conservation Plan, the range of western Joshua tree is considered to be approximately 13,088 square kilometers (5,053.3 square miles) and is illustrated in Figure 4-1.

**reburns.** Fires burning in a recent fire scar.

**recruitment.** The process by which new individuals are added to a species' population

**relocate.** The terms "relocate" and "relocation" mean the removal of a living western Joshua tree and a sufficient portion of its root mass from the ground and transplanting it (Fish & G. Code, § 1927.1, subd. (j)).

**restoration.** Habitat restoration is the act of recreating characteristics of a site to bring it back to a condition that existed under the stewardship of California Native American tribes or before it was damaged or degraded by natural or human disturbances post-colonization.

## S

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## T

**take.** Hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill. (Fish & G. Code, § 86).





**threatened species.** A native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts (Fish & G. Code, § 2067).

**tribal lands.** Tribal lands include lands meeting the definition of "Indian country" in 18 US Code Section 1151 held in trust by Tribes (rancherias/reservations) or tribal members (individual allotments usually within rancherias/reservations); fee lands held by Tribes (land purchased and owned by a Tribe typically outside of rancherias/reservations); or fee lands held by tribally-led nonprofits (e.g., Native American Land Conservancy) or nonprofits formed by non-Federally recognized Tribes to act on the Tribe's behalf as a vehicle to hold land.

**Traditional Ecological Knowledge.** Also known as TEK, Traditional Ecological Knowledge refers to the evolving knowledge acquired by Native and indigenous peoples over hundreds or thousands of years through direct contact with the environment. Traditional Ecological Knowledge is an accumulating body of knowledge, practices, and beliefs, evolving by adaptive processes and handed down through generations by cultural transmission, about the interconnected relationships of living beings (human and non-human) with one another and the environment. Traditional Ecological Knowledge encompasses the world view of Native people, which includes ecology, spirituality, human and animal relationships, and more.

## U

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## V

**vegetation communities.** Groups of plant species that tend to co-occur and repeat across the landscape (e.g., Joshua tree woodland alliance).

## W

**western Joshua tree.** The common name for *Yucca brevifolia*; an evergreen, tree-like plant that has been treated as a member of the asparagus family (Asparagaceae) (Fish & G. Code, § 1927.1, subd. (l)).

**wildland fire.** Wildland fire is an environmental and human health and safety hazard where unplanned and uncontrolled fire burns on the landscape.

**wildland-urban interface.** Zone of transition between unoccupied land and human development. It is the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.



## X

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## Y

**yucca moth.** One of many moth species in the genera *Tegeticula* or *Parategeticula*, which are specialized pollinators for yucca plant species. The obligate pollinator for western Joshua tree is *Tegeticula synthetica*.

## Z

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## CHAPTER 4 SUMMARY OF RESOURCE CONDITIONS

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## CHAPTER 6 IMPLEMENTATION

Bears Ears Commission (Hopi Tribe, Navajo Nation, Ute Mountain Ute Tribe, Ute Indian Tribe of the Uintah and Ouray Reservation, and the Pueblo of Zuni), US Bureau of Land Management, and US Forest Service (Bears Ears National Monument Cooperative Agreement). 2022. Inter-Governmental Cooperative Agreement between the Tribal Nations whose representatives comprise the Bears Ears Commission, the Hopi Tribe, Navajo Nation, Ute Mountain Ute Tribe, Ute Indian Tribe of the Uintah and Ouray Reservation, and the Pueblo of Zuni and the United States Department of the Interior, Bureau of Land Management and the United States Department of Agriculture, Forest Service for the Cooperative Management of the Federal Lands and Resources of the Bears Ears National Monument. Available from: <https://www.blm.gov/sites/default/files/docs/2022-06/Bears%20Ears%20National%20Monument%20Inter-Governmental%20Cooperative%20Agreement%202022.pdf> (Accessed: 19 August 2024).

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CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

# Western Joshua Tree Conservation Plan



VOLUME II: APPENDICES

Presented to the  
California Fish and Game Commission

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JUNE 2025



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# Appendix A.

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## Agency Feedback Questionnaire





## Western Joshua Tree Conservation Plan – Government Agency Request for Feedback

**Specific western Joshua tree (WJT) feedback could be related to any of the following items, whether applicable on lands you manage or are familiar with from other entities within your surrounding area:**

1. What is your agency currently doing to manage WJT? (Can relate to vegetation in general or specific to WJT)
2. What are your agencies' best management practices for the following:
  - a. Wildfire suppression/prevention in WJT habitat
  - b. Invasive species control in WJT habitat
  - c. Relocation of WJT (if so, do you have a relocation specialist that can provide guidance?)
  - d. Soil Erosion
  - e. Grazing
  - f. Motor vehicle recreation
3. Have there been any WJT-specific restoration/conservation efforts in the past, present, or in future planning? (e.g., seed collection/banking, replanting WJT, replanting/seeding native nurse plants for WJT, WJT relocation, etc.)
4. CDFW is currently seeking input from agencies on acceptable parameters for a WJT conservation agreement between federal, state, and local jurisdictions. Would your agency approve of the following: (agree, disagree, agree but with conditions)
  - a. Making WJT a species of management/conservation concern,
  - b. Implementing special management considerations in WJT habitat, including long-term management and habitat enhancement strategies,
  - c. Implementing special management considerations in WJT climate refugia once identified,
  - d. Limiting ground disturbing impacts in WJT habitat,



- e. Limiting vegetation removal in WJT habitat,
  - f. Establishing avoidance buffers around WJT based on tree size,
  - g. Limiting WJT removal,
  - h. Relocating WJT when removal is needed,
  - i. Restoring degraded WJT habitat,
  - j. Restoring degraded WJT climate refugia,
  - k. Enhancing WJT habitat (e.g. planting additional WJT and/or nurse plants),
  - l. Enhancing WJT climate refugia (e.g. science-based assisted gene flow),
  - m. Accepting relocated WJT from projects outside of your jurisdiction boundaries (limited to 10 miles and 500 ft elevation difference), or
  - n. Hosting range-wide monitoring plots.
5. Would your agencies be interested in receiving and managing adjacent or privately in-held WJT land that was purchased using state mitigation funds (i.e. durability agreements)?
6. Does your agency have partnerships/agreements with local Native American tribes? If so, please describe.
7. Is there any other feedback/information you would like to provide to CDFW regarding WJT conservation? Examples could include the following:
- a. Locations of your healthiest WJT stands
  - b. Locations where your WJT stands are most stressed
  - c. Planning documents related to WJT
  - d. Yucca moth pollinators studies/reports or management activities
  - e. Criteria not mentioned in the presentation for identifying priority WJT conservation lands

Please contact Drew Kaiser, CDFW Senior Environmental Scientist and Western Joshua Tree Coordinator with feedback, comments, or additional questions:

**Email:** [WJT@wildlife.ca.gov](mailto:WJT@wildlife.ca.gov)

**Phone:** (916) 224-6469

Thank you!

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# Appendix B.

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## Agency and Public Input Summary Memo



# Input Summary Memo



**Date:** March 31, 2025

**To:** Andrew Kaiser, California Department of Fish and Wildlife

**From:** Curtis Alling, Linda Leeman, Jessie Quinn, Ascent

**Subject:** Summary of Input from Interagency, Researcher, and Public Outreach Meetings on the Western Joshua Tree Conservation Plan

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## INTRODUCTION

The California Department of Fish and Wildlife (CDFW) conducted a series of meetings to gather input from public agencies, the scientific community, and the general public to inform and guide development of the Western Joshua Tree Conservation Plan (Conservation Plan). The purpose of this memo is to summarize the key topics raised by meeting attendees to ensure that this input is captured in the Conservation Plan. The following table lists the outreach meetings focused on the development Conservation Plan that have occurred to date with federal, state, and local agencies; researchers; and the public. CDFW has held other outreach meetings related to permitting under the Western Joshua Tree Conservation Act (WJTCA). Input from meetings that occur after the Fish and Game Commission takes final action on the initial Conservation Plan in June 2025 will be addressed in future amendments or versions of the Conservation Plan.

| Meeting Type                                                     | Meeting Date & Time                      |
|------------------------------------------------------------------|------------------------------------------|
| State and Federal Agency Meeting #1                              | Thursday, February 29, 2024, 2–4pm       |
| Local Agency Meeting #1                                          | Thursday, February 29, 2024, 10–12pm     |
| Researcher Outreach Meeting #1                                   | Thursday, March 7, 2024, 10–12pm         |
| California State Parks Meeting #1                                | Wednesday, March 27, 2024, 10–11am       |
| Public Outreach Meeting #1                                       | Thursday, April 4, 2024, 10–12pm         |
| California State Parks Meeting #2                                | Wednesday, May 8, 2024, 10–11:45am       |
| State and Federal Agency Meeting #2                              | Wednesday, May 15, 2024, 2–4pm           |
| Local Agency Meeting #2                                          | Wednesday, May 15, 2024, 10–12pm         |
| California State Lands Commission Meeting #1                     | Wednesday, May 22, 2024, 10–11am         |
| California State Parks Meeting #3                                | Wednesday, June 12, 2024, 1–2pm          |
| Public Outreach Meeting #2                                       | Thursday, July 11, 2024, 2–4pm           |
| California Department of Forestry and Fire Protection Meeting #1 | Monday, July 15, 2024, 9–10am            |
| Public Workshops #1 and #2                                       | Monday, March 10, 2025, 10–1pm and 3–6pm |



## SUMMARY OF INPUT

### State and Federal Agency Meeting #1

The purpose of this meeting was to solicit input about current efforts to protect western Joshua tree from state and federal agencies that manage land in the geographic focus area of the Conservation Plan. In addition, the meeting provided an opportunity for CDFW to identify opportunities for collaboration with these state and federal agencies and gather feedback on issues of concern that the agencies would like to see addressed in the Conservation Plan.

Representatives from the following agencies attended the meeting: California State Parks (CSP), National Park Service (NPS), US Department of Fish and Wildlife Service (USFWS), US Navy (Naval Air Weapons Station China Lake), US Bureau of Land Management (BLM), US Department of Defense (DOD) (Edwards Air Force Base), California Department of Transportation (Caltrans), and US Forest Service (USFS). A full list of attendees and their affiliations is provided in the “List of Attendees” section below.

The following sections summarize the key topics relevant to the Conservation Plan that were discussed during the meeting:

### CURRENT MANAGEMENT AND RESEARCH EFFORTS

#### ► National Park Service

- Based on climate modeling, NPS anticipates losing approximately 80 percent of currently occupied western Joshua tree habitat in Joshua Tree National Park (JTNP) in the next 100 years. In a worst-case greenhouse gas emissions scenario, NPS anticipates that less than 1 percent of suitable habitat will remain within JTNP. NPS is exploring the suitability of higher elevation areas outside of JTNP for potential conservation of western Joshua tree.
- NPS has focused western Joshua tree restoration efforts on climate refugia areas within JTNP. Based on preliminary data, NPS assumes that populations of western Joshua tree in the eastern extent of JTNP are better adapted to dry environmental conditions that would be similar to the future conditions of climate refugia. NPS emphasized the importance of assisted migration (either as fruit, seeds, or trees) to locations that will be suitable for western Joshua tree in the future because climate change will occur quicker than the species can migrate on its own.
- NPS implements aggressive fire control measures and full fire suppression in JTNP to prevent the loss of western Joshua trees. NPS implements fuel breaks around larger expanses of western Joshua tree that have not burned and around unburnt islands within woodland areas in climate refugia. NPS is currently protecting western Joshua tree populations in non-refugia to allow for collection of genetic material. NPS also replants western Joshua trees in burned areas.

#### ► California State Parks

- CSP manages four parks with western Joshua tree range—Red Rock Canyon State Park (SP), Arthur Ripley Desert Woodland SP, Onyx Ranch State Vehicular Recreation Area (SVRA), and Hungry Valley SVRA. (Saddleback Butte SP was not mentioned in the meeting, but also contains western Joshua trees.) Current management efforts for western Joshua tree include enhancing native stands through collecting seeds and planting.
- CSP conducted a study of the natural postfire regeneration of western Joshua trees with and without predator exclusion fencing at Arthur Ripley Desert Woodland SP. The findings of this study can be used to inform the Conservation Plan.

## TOPICS TO ADDRESS IN THE CONSERVATION PLAN

- ▶ The Conservation Plan should discuss the indirect impact of erosion on western Joshua tree and address the protection of soil and biological soil crusts. (CSP)
- ▶ USFWS facilitates a western Joshua tree working group made up of State and federal agencies. The working group is developing standardized monitoring protocols to collect information on abundance trends across the range of the species. USFWS asked if there is potential to incorporate monitoring protocols in the Conservation Plan. A database to track western Joshua tree monitoring data may be time consuming and costly to develop and maintain. Outside support would be helpful in database efforts and would be within the scope of the working group's research and efforts. (USFWS)
- ▶ Priority areas for conservation should include climate refugia within western Joshua tree habitat and areas that do not presently support western Joshua trees but will become suitable habitat for the species in the future. (JTNP)

## OPPORTUNITIES FOR COLLABORATION

- ▶ Arthur Ripley Desert Woodland SP is interested in being a receiver site for relocated western Joshua trees. (CSP)
- ▶ Coordination between researchers and agency land managers would be helpful in developing Conservation Plan goals and management strategies. (USFWS)
- ▶ USFWS works with DOD agencies on conservation activities within military installations. USFWS recommends reviewing the integrated natural resource management plans for military installations that incorporate western Joshua tree management. Need to outreach more to DOD land management divisions to understand the policies that are already in place at DOD facilities for western Joshua tree management and conservation. (USFWS)

## Local Agency Meeting #1

The purpose of this meeting was to address and to gather feedback on issues of concern that local agencies would like to see addressed in the Conservation Plan. In addition, the meeting provided an opportunity for local agencies to identify how they would like to engage in the development of the Conservation Plan and how CDFW can align the plan's strategies with local agency conservation goals.

Meeting attendees included representatives from the following local agencies: City of Hesperia, City of Lancaster, City of Palmdale, City of Ridgecrest, San Bernardino County, Los Angeles County, Town of Yucca Valley, and Kern County. A full list of attendees and their affiliations is provided in the "List of Attendees" section below.

The following sections summarize the key topics that were discussed during the meeting:

## PERMITS, DELEGATION AGREEMENTS, AND OUTREACH

- ▶ A representative from the Town of Yucca Valley (Jared Jerome) noted that many residents have western Joshua trees in their yards and will likely need Western Joshua Tree Conservation Act (WJTCA) hazard management permits or incidental take permits (ITPs). Jared emphasized the importance of community outreach. Jared expressed interest in learning about protocols for delegation agreements for permit authorization and how the delegation agreements relate to the Conservation Plan. Jared also asked questions about funding mechanisms (i.e., how much property owners will be compensated for conservation easements on private property) and how conservation easements will be applied (e.g., as mitigation for development or as a strategy for protecting undeveloped properties).

- ▶ A representative from the Los Angeles County Planning Department (Caroline Chen) noted that town councils in Antelope Valley, such as Pearblossom, are interested in participating in outreach meetings and are awaiting direction for developing community standards to protect western Joshua trees.

## CONSERVATION APPROACHES

- ▶ The Los Angeles County Planning Department representative (Caroline Chen) suggested that the Conservation Plan include measures to protect biological soil crust.

## Researcher Outreach Meeting #1

The purpose of this meeting was to gather feedback on research topics and their potential conservation implications from researchers studying western Joshua tree. The meeting provided an opportunity for researchers to identify research to be incorporated into the Conservation Plan and opportunities for CDFW to align the plan's strategies with the best available science.

Meeting attendees included researchers affiliated with the following universities and agencies: Willamette University; California State University, Northridge (CSUN); Reed College; University of California, Riverside; University of California, Santa Cruz (UCSC); USFWS; and City of Lancaster. A full list of attendees and their affiliations is provided in the "List of Attendees" section below.

The following sections summarize the key topics that were discussed during the meeting:

## RELOCATION

- ▶ Michael Loik (UCSC) stated that there is not enough data to determine appropriate relocation distances for western Joshua trees. More information is needed on existing population genetic structures, availability of potential habitat, and land ownership of receiver sites.
- ▶ Consider developing a seed transfer zone map for western Joshua tree.
- ▶ Relocation strategies may differ between seedlings and mature trees.

## ASSISTED GENE FLOW

- ▶ Jeremy Yoder (CSUN) is gathering genetic data to determine whether trees at lower elevations and in drier climates (i.e., "hot adapted") are better adapted to future conditions.
- ▶ Consider whether western Joshua trees in areas where more permit applications have been received (e.g., Town of Yucca Valley) and areas of lower elevation that are experiencing environmental stressors (e.g., Town of Apple Valley, City of Victorville) are more appropriate for assisted gene flow.

## SOIL MICROBE RESEARCH

- ▶ Based on an environmental DNA (eDNA) study for an endangered lupine (*Lupinus* sp.), a researcher in Michael Loik's lab (UCSC) found a difference in microbial communities in plants grown in native habitats and plants grown in nurseries. Research on western Joshua tree microbial communities can help inform how plants are grown for restoration.
- ▶ Juniper Harrower (Reed College) is interested in the effects of microbial communities on restoration success in burned areas. Juniper noted that survival rates of out-planted western Joshua trees are low due to predation. She is conducting research that involves adding microbial communities from existing western Joshua trees and noted

that it would be important to use locally adapted mycorrhizae associated with nurse plants. She found that seedlings can be inoculated with a teaspoon of soil and the same mycorrhizal communities will form.

## CLIMATE REFUGIA

- ▶ Lynn Sweet (UC Riverside) noted that JTNP has implemented fuel treatments (e.g., fuel breaks) to protect western Joshua tree at higher elevations. Lynn is currently developing a Refugia Management Plan for JTNP which includes mapping areas where western Joshua trees are most vulnerable and identifying priority areas for fuel treatments (draft plan expected in June 2024). However, fuel treatments can have negative effects of increasing invasive species cover and disturbing existing western Joshua trees and its obligate pollinator, the yucca moth (*Tegeticula synthetica*).
- ▶ Lynn pointed out that the boundaries of predicted areas of future climate refugia should be regularly assessed and revised if they are being used to enact fine-scale conservation efforts based on established management units represented in geographic information system (GIS) shapefiles, given the uncertainty associated with modeled projections of those boundaries. Also, the planning team should consider whether the model timescales align with management timescales.
- ▶ Lynn published a study in *Ecosphere* in 2019 that modeled future habitat within JTNP under one future climate scenario. The study found higher seedling survival in upper elevations.
- ▶ USGS is conducting a 12-year resurvey on JTNP plots.

## POLLINATORS

- ▶ Jeremy Yoder's lab (CSUN) is working on a distribution model of western Joshua tree's obligate pollinator, the yucca moth, independent of the tree's distribution and is looking to identify the specific environmental conditions that the moths use to transition from larvae to adults. The researcher is planning to collect data on the temperature profile of soil where western Joshua tree populations are found. Based on the literature, low winter temperatures may be a cue for the moths to transition out of diapause and begin pollination. The research is attempting to understand how climate drives the moth's activities and how the moth's distribution may align with western Joshua tree's modeled climate refugia. This research would not be available for incorporation in the initial draft of the Conservation Plan, but distribution models may be available in August.

## NURSE PLANTS AND RECRUITMENT

- ▶ Based on surveys at Covington Flats in JTNP, Michael Loik (UCSC) observed that the shrub blackbrush (*Coleogyne ramosissima*) was important for western Joshua tree recruitment.
- ▶ Michael noted that Viceroy gold mine in Searchlight, Nevada had a restoration program for eastern Joshua tree (*Yucca jaegeriana*), which may provide useful information that can be applied to western Joshua tree.
- ▶ Nurse plants may be an important aspect of ensuring western Joshua tree survival in assisted migration or gene flow efforts. Research was conducted on eastern Joshua tree at Mojave National Preserve. The experiment evaluated the effects of different treatments (caged/non-caged and shaded/non-shaded) on the initial survival of small seedlings in a postfire environment. Caging showed a significant benefit to survival of small seedlings, but shading showed a negative impact on small seedlings (potentially related to competition).
- ▶ Lynn Sweet (UC Riverside) intends to research nurse plants for eastern Joshua trees.

## ADAPTIVE MANAGEMENT

- ▶ Consider adaptive management as an aspect of the Conservation Plan because science will continue to evolve beyond the deadline for the Conservation Plan. Consider strategies employed at JTNP.
- ▶ A poll of researchers could be used to assess whether research supports the proposed management actions and avoidance and minimization measures.

## OTHER RESEARCH TOPICS

- ▶ Michael Loik (UCSC) has unpublished baseline spectral data for western Joshua trees used in assessing plant health.

## California State Parks Meeting #1

The purpose of this meeting was to solicit input about current efforts by CSP to protect western Joshua tree and CSP's approach to co-management with California Native American tribes. In addition, the meeting provided an opportunity for CDFW to identify opportunities for collaboration with CSP, with the ultimate goal of developing a cooperative agreement. Meeting attendees included CSP staff from Headquarters, Great Basin District, Hungry Valley SVRA, and Onyx Ranch SVRA. A full list of attendees is provided in the "List of Attendees" section below.

The following sections summarize the key topics that were discussed during the meeting:

## LAND MANAGEMENT

- ▶ CSP has a high standard of resource stewardship; however, western Joshua tree may experience different levels of protection on CSP land depending on the use (e.g., off-highway vehicle [OHV] recreation areas receive less protection than ecological reserves).
- ▶ CSP may be interested in acquiring land purchased next to State Parks using the Western Joshua Tree Conservation Fund (Conservation Fund).
- ▶ CSP typically does not receive mitigation because of the potential to degrade conserved landscape. Land reclassification for receiver sites may occur at CSP discretion based on the General Plan goals and guidelines for each park.
- ▶ Grant funding can potentially be used to implement invasive species control at Arthur Ripley Desert Woodland SP.
- ▶ CSP will share policies, best management practices, and restoration activities relevant to western Joshua tree conservation.

## CONSERVATION APPROACHES

- ▶ Conservation approaches for western Joshua tree should include establishing reserves, addressing stressors, restoring habitat, responding to climate change, and protecting/restoring populations at higher elevations.
- ▶ CSP is interested in opportunities to be part of the Conservation Plan implementation (e.g., being part of a reserve system, acquiring land, developing collaborations, sharing protocols, using park land as receiver sites, and hosting long-term monitoring plots).



## RESEARCH

- ▶ CSP is conducting postfire research on western Joshua tree regeneration at Arthur Ripley Desert Woodland SP. The study is investigating impacts on western Joshua tree from high severity fire using basal sprouts. The study is attempting to determine the protocols that should be implemented when a stand of western Joshua tree burns.

## TRIBAL CO-MANAGEMENT

- ▶ CSP recently developed an memorandum of understanding (MOU) with a local Tribe and will share the document if it can be made publicly available.
- ▶ CSP indicated that western Joshua tree conservation has not been a high priority for Tribes in the area.

## Public Outreach Meeting #1

The purpose of this meeting was to solicit input from the public on the elements, content, and issues to be addressed in the Conservation Plan. Meeting attendees included land/property owners, real estate brokers, trade association representatives, non-profit land conservancy and conservation association representatives, town council association representatives, regulatory consultants, biologists, local agency staff, and legislative office representatives.

The following sections summarize the key topics that were discussed during the meeting:

## MITIGATION APPROACHES

- ▶ Commenters expressed concerns that current mitigation approaches still result in the net loss of western Joshua tree. A researcher stated that a 1:1 tree replacement ratio is not sufficient because approximately 10 seeds and 100 years are needed to produce one mature western Joshua tree.
- ▶ One commenter requested consideration for mitigation of western Joshua trees that colonize fallowed agricultural land.
- ▶ One commenter (regulatory consultant) asked how management approaches will differ in reduced fee areas.

## TRANSPLANTING STRATEGIES

- ▶ Commenters recommended that CDFW establish guidelines for transplanting trees to ensure survival. Commenters suggested that transplanted trees be relocated near their points of origin to areas with similar altitude and soil conditions. However, another commenter recommended assisted migration and moving trees to cooler sites that serve as climate refugia.
- ▶ Commenters suggested that CDFW consider the efficacy of transplant methods. One commenter stated that using spades for relocation is 6 to 8 times more successful than bare rooting for western Joshua trees over 8 feet tall.
- ▶ Commenters recommended that CDFW develop a system of tracking trees to monitor survivability.
- ▶ One commenter asked for clarification on whether relocation is considered an impact or a conservation strategy.

## CONSERVATION STRATEGIES

- ▶ Commenters stated that the Conservation Plan should place higher emphasis on in situ preservation of western Joshua tree over habitat creation and restoration due to the length of time it takes for the species to mature and provide functioning habitat. Subsequently, a commenter suggested that the fee structure favor preservation.

- ▶ One commenter expressed concerns that western Joshua trees are being transplanted to landscaped areas rather than conservation lands. The commenter suggested that the Conservation Plan treat western Joshua tree as a keystone species with habitat value rather than a landscape plant.
- ▶ One commenter suggested that the Conservation Plan ensure habitat connectivity for species that use western Joshua tree habitat (e.g., LeConte's thrasher [*Toxostoma lecontei*], loggerhead shrike [*Lanius ludovicianus*]) to prevent these species from declining and becoming listed.
- ▶ Commenters suggested that the Conservation Plan incorporate measures to maintain existing soil mycorrhizae and protect western Joshua tree's obligate pollinator.
- ▶ One commenter recommended that the Conservation Plan establish a baseline, describe long-term management opportunities, and consider uncertainties.
- ▶ Commenters expressed concerns that mitigation and conservation lands are located outside the current distribution of western Joshua tree.
- ▶ Commenters suggested that the Conservation Plan should deter development and solar and wind projects from high density populations of western Joshua tree and encourage developers to build in disturbed areas.

## PERMITTING

- ▶ Commenters expressed concerns about how permit requirements will be enforced at the local level. Commenters recommended that CDFW develop a mechanism and funding for oversight to ensure that applicants adhere to permit requirements.
- ▶ Commenters (particularly landowners/developers, real estate brokers, regulatory consultants, and government representatives) expressed concern about balancing western Joshua tree conservation with housing needs and impacts on property owners. Commenters expressed concerns about permitting costs and diminished property values due to these costs. One commenter suggested fee waivers for single-family homeowners. One commenter expressed support for placing limits on tree removal, but noted that sprouts on a single tree make it too easy to exceed these limits.
- ▶ Commenters asked whether the WJTCA allows landowners to collect seeds and reproduce, plant, or relocate western Joshua trees within their private property without risk of take.
- ▶ A representative from San Bernardino County requested permitting streamlining for public works safety projects (e.g., emergency repairs).
- ▶ One commenter asked how conservation efforts will be funded if the money received from permitting fees is not sufficient.

## OTHER TOPICS

- ▶ One commenter suggested that environmental justice be a consideration in the Conservation Plan.
- ▶ One commenter expressed interest in reviewing input from Tribes.

## California State Parks Meeting #2

The purpose of this meeting was to solicit input from CSP on their Tribal MOU program. A full list of attendees is provided in the "List of Attendees" section below.

During the meeting, CSP discussed lessons learned from their prior experience establishing agreements with California Native American tribes. CSP also provided recommendations related to the following:

- ▶ Collaborations and funding sources;
- ▶ Protocols and procedures for communication and information sharing, including tailored approaches to the unique needs of each Tribe;
- ▶ MOU content, including the importance of defining the regulatory framework and legal obligations and identifying priorities and mutually beneficial activities for the agreements;
- ▶ Importance of including all relevant staff and leadership;
- ▶ Strategies for decision-making; and
- ▶ Suggestions on the format for discussions and process of incorporating input from Tribes.

## State and Federal Agency Meeting #2

The purpose of this meeting was to solicit additional input about current efforts to protect western Joshua tree from state and federal agencies that manage land in the geographic focus area of the Conservation Plan. In addition, the meeting provided a second opportunity for CDFW to provide updates to the proposed management actions, identify opportunities for collaboration with these state and federal agencies, and gather feedback on issues of concern that the agencies would like to see addressed in the Conservation Plan.

Representatives from the following agencies attended the meeting: CSP, California State Lands Commission (CSLC), California Department of Forestry and Fire Protection (CAL FIRE), DOD, NPS, USFWS, US Navy, BLM, Caltrans, and USFS. A full list of attendees and their affiliations is provided in the "List of Attendees" section below.

The following topics relevant to the Conservation Plan were discussed during the meeting:

- ▶ CSP (Leah Gardner) indicated that OHV use is more impactful to western Joshua trees in open riding areas than on designated trails within State Parks. Accordingly, the Conservation Plan should clarify that negative impacts related to OHV use refer to unrestricted off-trail use.
- ▶ CSP (Leah Gardner) noted that land use categories in State Parks include natural and cultural preserves, which have more restricted use than recreation areas.
- ▶ CSP (Leah Gardner) recommended expanding on the management actions to include actions that minimize erosion and minimize impacts on biological soil crusts.
- ▶ CSP (Chris Hon) recommended clarifying what is meant by grazing in the Conservation Plan, since there is a difference in the effects from grazing by livestock and by native mammals.

## Local Agency Meeting #2

The purpose of this meeting was to provide updates to the proposed management actions and address and gather additional feedback on issues of concern that local agencies would like to see addressed in the Conservation Plan. In addition, the meeting provided a second opportunity for local agencies to identify how they would like to engage in the development of the Conservation Plan and how CDFW can align the plan's strategies with local agency conservation goals.

Meeting attendees included representatives from the following local agencies: Los Angeles County, San Bernardino County, Riverside County, City of Adelanto, City of Palmdale, California City, City of Victorville, and City of Hesperia. A full list of attendees and their affiliations is provided in the "List of Attendees" section below.

The following sections summarize the key topics that were discussed during the meeting:

- ▶ A representative from the Los Angeles County Planning Department (Caroline Chen) raised concern with using mulch to cover exposed soils during the creation of fire lines because of the potential for mulch to catch on fire.

- ▶ A representative from the Los Angeles County Planning Department (Mark Herwick) asked about the likelihood of developing preserves, whether there is a minimum size requirement for preserves, and if the Conservation Plan considers connectivity between preserves.
- ▶ Local jurisdictions expressed concerns related to permitting and requested clarification about the types of impacts that would occur within certain distances of trees. Representatives from the Los Angeles County Planning Department (Lorraine Acuna) and City of Hesperia (Andrew Lemke) expressed concerns about how single family homeowners would be affected by impact buffers around trees and noted that different jurisdictions use different buffers. A representative from the City of Victorville (Alex Jauregui) requested clarification on the requirements for triggering an incidental take permit and asked if different requirements would apply depending on the ecological value of the land. A representative from San Bernardino County (Karen Carter) expressed concerns about maintaining existing roads that are within the avoidance buffers of trees.

## California State Lands Commission Meeting #1

The purpose of this meeting was to solicit input from the CSLC about current efforts to protect western Joshua tree. In addition, the meeting provided an opportunity for CDFW to identify opportunities for collaboration with CSLC and gather feedback on issues of concern that CSLC would like to see addressed in the Conservation Plan. A full list of attendees and their affiliations is provided in the "List of Attendees" section below.

The following sections summarize the key topics relevant to the Conservation Plan that were discussed during the meeting:

- ▶ CSLC has jurisdiction over State Lands, which include School Lands and Sovereign Lands.
- ▶ On School Lands, CSLC issues leases for various project types, including electrical transmission infrastructure, grazing, guzzlers, state highway improvements, mineral extraction, and renewable energy development. All leases on School Lands must undergo the California Environmental Quality Act (CEQA) process, which evaluates impacts on western Joshua tree. CSLC is typically the lead agency under CEQA and is open to receiving guidance from CDFW on recommended protections for western Joshua tree. Fees are required for leases on School Lands. CSLC has been seeking to consolidate School Lands for conservation, but the Federal government has not made progress on implementation. CSLC generally does not sell School Lands parcels.
- ▶ Sovereign lands include navigable lakes, rivers, the area from the shore to three miles into the ocean, and other larger natural water bodies. CSLC has jurisdiction on lands where these resources were located on the date of California statehood. Fees for leases on Sovereign Lands can be waived.
- ▶ Projects on State Lands must consider the historic lands inventory as part of the CEQA analysis. One wind energy project on State Lands involved evaluation of a historic Joshua tree display and incorporated mitigation to locate infrastructure away from this population of trees.
- ▶ CSLC has issued leases on State Lands to CSP and CDFW for conservation and preservation purposes. These types of leases are typically long-term (10–20 years). CSLC can issue long-term leases to CDFW for preservation of land in modeled climate refugia. However, leases are not exclusive and applicants may apply for leases on parcels held under long-term leases for conservation and preservation. CSLC would be required to review any applications, but is unlikely to approve the application if the new project conflicts with the conservation and preservation of western Joshua tree.
- ▶ CSLC is amenable to disclosing a collaboration between CDFW and CSLC to preserve western Joshua tree on State Lands in the Conservation Plan.

## California State Parks Meeting #3

The purpose of this meeting was to solicit input from CSP on the management actions that are being developed for the Conservation Plan and potential implementation in State Parks with western Joshua trees. A full list of attendees is provided in the "List of Attendees" section below.

The following sections summarize the key topics that were discussed during the meeting:

### OFF-HIGHWAY VEHICLE USE

- ▶ CSP requires each State Vehicular Recreation Area to follow a Wildlife Habitat Protection Plan and a Soil Conservation Plan. These plans are in development and are expected to be released to the public by the end of 2024. CSP recommends referencing these plans in the Conservation Plan.
- ▶ CSP requires park visitors and employees to stay on designated trails and roads. CSP manages off-trail riding by repairing and replacing fences and erecting barriers (e.g., straw bales or permanent fences).

### CONSERVATION AGREEMENTS

- ▶ CSP staff expressed that they need to understand more specifics about the Conservation Plan before making commitments. They suggested that the Conservation Plan should allow for flexibility and should identify the commitment to maintain ongoing collaboration, restoration opportunities that could be funded by the Conservation Fund, and guidance for relocating western Joshua trees.

### MANAGEMENT PRACTICES

- ▶ CSP typically manages habitat rather than individual species. CSP staff indicated that they would not agree to blanket avoidance buffers (e.g., 1 meter buffer around western Joshua tree).
- ▶ CSP does not deal with mitigation or conservation easements.
- ▶ The Natural Resources Department of CSP does not deal with acquiring land for management; however, this topic can be discussed with another division of CSP.

### WESTERN JOSHUA TREE RELOCATION

- ▶ CSP staff wants to understand their responsibilities if they were to accept relocated western Joshua trees on State Park lands.
- ▶ There was disagreement among CSP staff about whether a 10-mile limit on relocation distances would be acceptable.
- ▶ CSP indicated that they cannot participate in gene flow management activities.
- ▶ CSP raised questions related to success rates of relocating trees and the length of time for maintenance activities, such as watering.
- ▶ CSP identified challenges with relocating trees to Onyx Ranch SVRA because much of the land is inaccessible (e.g., bringing water trucks to relocation sites, liabilities). CSP indicated that Arthur B. Ripley Desert Woodland SP is more accessible.



## PROJECT EVALUATION

- ▶ CSP is required to fill out a Project Evaluation Form for any project involving ground disturbance, including tree relocation and habitat enhancement. The review period for form approval is 3 to 6 months. Tribes may request to consult during this process.

## LONG-TERM MONITORING

- ▶ CSP encourages scientific research and issues permits for research activities. Science permits typically take a few months to process. CSP would accept establishment of long-term monitoring plots and recommends that are clearly marked.

## Public Outreach Meeting #2

The purpose of this meeting was to solicit additional input from the public on the elements, content, and issues to be addressed in the Conservation Plan. Meeting attendees included regulatory consultants, government agency and special district representatives, private landowners, attorneys, construction and landscaping companies, non-profit land conservancy and conservation association representatives, university affiliates, utility and solar companies, and news reporters.

The following topics relevant to the Conservation Plan were discussed during the meeting:

- ▶ Commenters expressed concerns related to permitting. Commenters opposed the permitting of certain solar projects and expressed concerns that permitting will pose a higher financial burden for individual property owners and disadvantaged communities compared to large-scale developers. Commenters also expressed concern about enforcement of permit conditions when delegating permitting authority to local governments. In addition, commenters asked whether mitigation fee levels would correspond with habitat quality.
- ▶ Commenters recommended conducting additional research on seed dispersers and the effects of grazing animals on western Joshua trees.
- ▶ Commenters suggested that translocation success rates are overstated and expressed a preference for preservation over relocation, particularly for clonal trees.
- ▶ Commenters raised questions about the types of activities covered under the WJTCA.
- ▶ Commenters raised questions about how conservation funds would be sourced, managed, spent, and made transparent to the public.
- ▶ Commenters raised questions about the enforceability of management actions in the Conservation Plan.
- ▶ A representative from the Town of Yucca Valley (Jared Jerome) raised questions about impacts from fire breaks and the reasoning behind fire break recommendations.

## California Department of Forestry and Fire Protection Meeting #1

The purpose of this meeting was to solicit input from the CAL FIRE San Bernardino Unit about potential fire and fuel treatment strategies. In addition, the meeting provided an opportunity for CDFW to identify opportunities for collaboration with CAL FIRE and gather feedback on issues of concern that CAL FIRE would like to see addressed in the Conservation Plan. A full list of attendees and their affiliations is provided in the "List of Attendees" section below.

The following sections summarize the key topics that were discussed during the meeting:

## FUEL TREATMENT STRATEGIES

- ▶ CAL FIRE's approach to fuel reduction in western Joshua tree habitat is implementing manual treatments, with mechanical treatments where possible. CAL FIRE has had issues with grazing in the past and noted that herbicide application may become more limited due to the listing of bumble bees. CAL FIRE has not implemented prescribed fire because western Joshua tree is not a fire-adapted species. CAL FIRE recommends including manual and mechanical treatments in the Conservation Plan.
- ▶ The San Bernardino Unit implements treatments within the State Responsibility Area. Treatments typically occur on state and private land, but CAL FIRE is interested in cooperating more with federal agencies. Western Joshua trees are also present in Los Angeles County (contracted with CAL FIRE) and the Riverside Unit.
- ▶ CAL FIRE has implemented one fuel treatment project in an area with a large population of western Joshua trees. The treatment area encompassed approximately 60–80 acres in Piñon Hills, a transition zone with pinyon pine. Manual treatments were implemented within buffers around western Joshua trees and mechanical treatments were implemented outside of buffers. CAL FIRE noted that treatments may not be feasible if typical buffers (e.g., 50 feet) are required around trees.
- ▶ The Conservation Plan can include fire management strategies. CAL FIRE can implement treatments to protect climate refugia if they receive input on design elements. Fire prevention strategies (e.g., implementing fuel treatments) are more likely to be followed than strategies implemented during an active fire.

## OPPORTUNITIES FOR COLLABORATION

- ▶ CAL FIRE is primarily concerned with implementing fuel treatments to protect health and safety (e.g., evacuation routes) and infrastructure. CAL FIRE is already working with CDFW to ensure that they are adequately protecting western Joshua tree during implementation of projects. CAL FIRE has funding for collaboration with CDFW. Edith Martinez is CDFW's current point of contact with CAL FIRE.
- ▶ CDFW would like to work with CAL FIRE to develop mitigation measures to protect western Joshua tree for projects that benefit ingress/egress and infrastructure. Fuel treatment projects may be funded through the Conservation Fund.
- ▶ The Conservation Plan could describe the process for collaboration between CDFW and CAL FIRE, as follows: (1) CAL FIRE develops a project; (2) CAL FIRE submits the project to CDFW fire staff (currently Edith Martinez); and (3) CDFW fire staff connects with the western Joshua tree team for review.
- ▶ CAL FIRE is interested in participating in the fire fuels and invasive species subgroup of the interagency biological working group for Joshua tree.

## Public Workshop Meetings #1 and #2

CDFW held two public workshop meetings on March 10, 2025, one in the morning (10–1pm) and one in the afternoon (3–6pm). The same content was presented at both workshops, with different times available to the public to allow for increased attendance. The purpose of these workshops was to address comments on the draft Conservation Plan released to the public on November 22, 2024 that were provided by mail/email, as well as verbal comments received during the Commission's February 12, 2025 public hearing on the Conservation Plan. The workshops also aimed to address comments received about the WJTCA, and provided clarity on the difference between the Conservation Plan and WJTCA and a description of ITPs under the WJTCA and California Endangered Species Act. The workshop presentation included a brief overview of these topics, a summary of comments received to date on the draft Conservation Plan, and anticipated changes to the Conservation Plan based on these comments. The workshops also provided an open public forum to solicit additional feedback and answer questions on these topics.

Meeting attendees included government agency and special district representatives; town council association representatives; Tribal representatives; regulatory consultants; biologists; private land/property owners; real estate brokers and developers; property management companies; trade association representatives; attorneys; contractors; arborists; non-profit land conservancy and conservation association representatives; agricultural advocacy group representatives; university affiliates; news reporters; and professionals from utility and renewable energy companies, engineering and architecture firms, construction companies, and landscaping companies.

The following sections summarize some of the key topics relevant to the Conservation Plan that were discussed during the workshops:

## WESTERN JOSHUA TREE CONSERVATION PLAN CONTENT

- ▶ Commenters expressed support for the recommendations and management actions in the Conservation Plan.
- ▶ One commenter advocated for low-conflict siting of renewable energy development to ensure the retention of intact western Joshua tree habitat.
- ▶ One commenter requested additional details about the Tribal monitoring that may be recommended or required for removal, trimming, and relocation of western Joshua trees.

## WESTERN JOSHUA TREE CONSERVATION ACT REQUIREMENTS AND PERMITTING

- ▶ Commenters raised questions and concerns related to permit requirements under WJTCA. One commenter expressed concern about equitable consideration of individual landowners in decision-making related to permitting requirements under the WJTCA. Some commenters questioned whether a 50-foot-radius buffer for protecting western Joshua tree root zones is supported by best available science and suggested that smaller buffer distances may be warranted. One commenter expressed support for retaining the recommended buffer distance, but allowing for some exemptions (e.g., in areas where existing development occurs within a buffer or for some residential properties). One commenter suggested expanding the fees required for removal of trees taller than 5 meters to include trees taller than 3.5 meters.
- ▶ Several residential landowners and utility districts expressed concern about in-lieu fee mitigation costs associated with implementing mandated connections to utility lines.
- ▶ Commenters raised concerns about costs associated with relocation and additional mitigation requirements that could be imposed outside of the WJTCA, particularly due to the size of the avoidance buffers being infeasible to implement.
- ▶ Commenters were concerned about costs for individual residential landowners to complete CEQA review of ITP applications.
- ▶ Commenters requested additional information, including sources of information for census survey methods and guidance for becoming a Desert Native Plant Specialist.
- ▶ Commenters requested information and provided suggestions related to relocation methods, including requests for data on the success of relocation and other mitigation efforts, a list of relocation sites, and guidance for cases when there are no willing receiver sites.
- ▶ Commenters expressed concerns about unauthorized western Joshua tree removal and permit violations by utility companies and local jurisdictions regarding take of western Joshua tree, and suggestions for tracking compliance.

## LIST OF ATTENDEES

The following tables provide lists of attendees from CDFW's meetings with public agencies and the scientific community. Attendees are grouped by organization and then listed alphabetically by first name. In total, nearly 800 members of the general public attended the public outreach and workshop meetings; the attendee lists for those meetings are not provided herein.

### State and Federal Agency Meeting #1 Attendees

| Name                | Organization                                      |
|---------------------|---------------------------------------------------|
| Curtis Alling       | Ascent                                            |
| Hannah Weinberger   | Ascent                                            |
| Jessie Quinn        | Ascent                                            |
| Linda Leeman        | Ascent                                            |
| Tracy Prybyla       | Ascent                                            |
| Alisa Ellsworth     | California Department of Fish and Wildlife        |
| Drew Kaiser         | California Department of Fish and Wildlife        |
| Jeb Bjerke          | California Department of Fish and Wildlife        |
| Jeff Drongesen      | California Department of Fish and Wildlife        |
| Josh Grover         | California Department of Fish and Wildlife        |
| Julie Vance         | California Department of Fish and Wildlife        |
| Kelley Barker       | California Department of Fish and Wildlife        |
| Kevin Thomas        | California Department of Fish and Wildlife        |
| Lani Maher          | California Department of Fish and Wildlife        |
| Laura Petersen-Diaz | California Department of Fish and Wildlife        |
| Mariel Boldis       | California Department of Fish and Wildlife        |
| Sara Kern           | California Department of Fish and Wildlife        |
| Steve Ingram        | California Department of Fish and Wildlife        |
| Beau Tindall        | California Department of Transportation           |
| William Hunt        | California Department of Transportation           |
| Leah Gardner        | California State Parks                            |
| Kathryn Tobias      | California State Parks                            |
| Jay Goodwin         | National Park Service (Joshua Tree National Park) |
| Frank Giles         | US Bureau of Land Management                      |
| Judy Perkins        | US Bureau of Land Management                      |
| Kim Marsden         | US Bureau of Land Management                      |
| LaReina Van Sant    | US Bureau of Land Management                      |
| Larry Zimmerman     | US Department of Defense, Edwards Air Force Base  |
| Misty Hailstone     | US Department of Defense, Edwards Air Force Base  |
| Felicia Sirchia     | US Department of Fish and Wildlife Service        |

| Name            | Organization                                  |
|-----------------|-----------------------------------------------|
| Julie Simonsen  | US Department of Fish and Wildlife Service    |
| Laura Ashfield  | US Forest Service                             |
| Cynthia Hopkins | US Navy, Naval Air Weapons Station China Lake |
| Julia Hendrix   | US Navy, Naval Air Weapons Station China Lake |

## Local Agency Meeting #1 Attendees

| Name              | Organization                               |
|-------------------|--------------------------------------------|
| Drew Kaiser       | California Department of Fish and Wildlife |
| Jeb Bjerke        | California Department of Fish and Wildlife |
| Mariel Boldis     | California Department of Fish and Wildlife |
| Sara Kern         | California Department of Fish and Wildlife |
| Kelley Barker     | California Department of Fish and Wildlife |
| Jeff Drongesen    | California Department of Fish and Wildlife |
| Steve Ingram      | California Department of Fish and Wildlife |
| Kevin Thomas      | California Department of Fish and Wildlife |
| Julie Vance       | California Department of Fish and Wildlife |
| Alisa Ellsworth   | California Department of Fish and Wildlife |
| Lani Maher        | California Department of Fish and Wildlife |
| Jessie Quinn      | Ascent                                     |
| Linda Leeman      | Ascent                                     |
| Curtis Alling     | Ascent                                     |
| Tracy Prybyla     | Ascent                                     |
| Hannah Weinberger | Ascent                                     |
| John Moreno       | Bowman Group                               |
| Casey Brooksher   | City of Hesperia                           |
| Tammy Pelayes     | City of Hesperia                           |
| Corrie Kates      | City of Hesperia                           |
| Daniel Aguilar    | City of Hesperia                           |
| Jocelyn Swain     | City of Lancaster                          |
| Megan Taggart     | City of Palmdale                           |
| Heather Spurlock  | City of Ridgecrest                         |
| Greg Griffith     | San Bernadino County                       |
| Ayida Smith       | San Bernadino County                       |
| Lacy Blackwell    | San Bernadino County                       |
| Julia Addison     | San Bernadino County                       |
| Linda Mawby       | San Bernadino County                       |
| Jai Cheng         | San Bernadino County                       |



| Name                | Organization         |
|---------------------|----------------------|
| Mark Wardlaw        | San Bernadino County |
| Karen Carter        | San Bernadino County |
| Nancy Sansonetti    | San Bernadino County |
| Manie Cruz          | San Bernadino County |
| Mark Herwick        | Los Angeles County   |
| Thuy Hua            | Los Angeles County   |
| Amy Bodek           | Los Angeles County   |
| Joseph Decruyenaere | Los Angeles County   |
| Caroline Chen       | Los Angeles County   |
| Evan Willoughby     | Town of Yucca Valley |
| Markus Spiegelberg  | ICF                  |
| Craig Murphy        | Kern County          |

## Researcher Outreach Meeting #1 Attendees

| Name              | Organization                               |
|-------------------|--------------------------------------------|
| Curtis Alling     | Ascent                                     |
| Hannah Weinberger | Ascent                                     |
| Linda Leeman      | Ascent                                     |
| Benjamin Waitman  | California Department of Fish and Wildlife |
| Cristin Walters   | California Department of Fish and Wildlife |
| Drew Kaiser       | California Department of Fish and Wildlife |
| Jeb Bjerke        | California Department of Fish and Wildlife |
| Mariel Boldis     | California Department of Fish and Wildlife |
| Jeremy Yoder      | California State University, Northridge    |
| Lauren Lien       | City of Lancaster                          |
| Juniper Harrower  | Reed College                               |
| Lynn Sweet        | University of California, Riverside        |
| Michael Loik      | University of California, Santa Cruz       |
| Julie Simonsen    | US Department of Fish and Wildlife Service |
| Christopher Smith | Willamette University                      |

## California State Parks Meeting #1 Attendees

| Name               | Organization                               |
|--------------------|--------------------------------------------|
| Curtis Alling      | Ascent                                     |
| Hannah Weinberger  | Ascent                                     |
| Ben Waitman        | California Department of Fish and Wildlife |
| Cristin Walters    | California Department of Fish and Wildlife |
| Drew Kaiser        | California Department of Fish and Wildlife |
| Isabel Baer        | California Department of Fish and Wildlife |
| Jeb Bjerke         | California Department of Fish and Wildlife |
| Arthur Heredia     | California State Parks                     |
| Christopher Hon    | California State Parks                     |
| Jessica Vannatta   | California State Parks                     |
| Leah Gardener      | California State Parks                     |
| Luis DeVera        | California State Parks                     |
| Melissa Patten     | California State Parks                     |
| Poya Kouchesfahani | California State Parks                     |
| Ron Melcer         | California State Parks                     |
| Scott Soars        | California State Parks                     |
| Tricia             | California State Parks                     |

## California State Parks Meeting #2 Attendees

| Name            | Organization                               |
|-----------------|--------------------------------------------|
| Curtis Alling   | Ascent                                     |
| Jessie Quinn    | Ascent                                     |
| Cristin Walters | California Department of Fish and Wildlife |
| Drew Kaiser     | California Department of Fish and Wildlife |
| Mariel Boldis   | California Department of Fish and Wildlife |
| Sarah Fonseca   | California Department of Fish and Wildlife |
| Dena Mitchell   | California State Parks                     |
| Leslie Hartzell | California State Parks                     |
| Patricia Garcia | California State Parks                     |

## State and Federal Agency Meeting #2 Attendees

| Name                  | Organization                                                                          |
|-----------------------|---------------------------------------------------------------------------------------|
| Curtis Alling         | Ascent                                                                                |
| Hannah Weinberger     | Ascent                                                                                |
| Jessie Quinn          | Ascent                                                                                |
| Tracy Prybyla         | Ascent                                                                                |
| Cristin Walters       | California Department of Fish and Wildlife                                            |
| Drew Kaiser           | California Department of Fish and Wildlife                                            |
| Harvest Vieira        | California Department of Fish and Wildlife                                            |
| Isabel Baer           | California Department of Fish and Wildlife                                            |
| Lani Maher            | California Department of Fish and Wildlife                                            |
| Margaret Mantor       | California Department of Fish and Wildlife                                            |
| Mariel Boldis         | California Department of Fish and Wildlife                                            |
| Carol Snow            | California Department of Forestry and Fire Protection                                 |
| David Haas            | California Department of Forestry and Fire Protection                                 |
| Ian McBride           | California Department of Forestry and Fire Protection                                 |
| Amber Stoerp          | California Department of Transportation                                               |
| Jennifer Blake        | California Department of Transportation                                               |
| Julie Sage            | California Department of Transportation                                               |
| Katie Rodriguez       | California Department of Transportation                                               |
| Michelle Gilmore      | California Department of Transportation                                               |
| Sam Daley             | California Department of Transportation                                               |
| Christina MacDonald   | California Department of Transportation, District 9                                   |
| Laurel Zickler-Martin | California Department of Transportation, District 9                                   |
| Matt Hoffman          | California Department of Transportation, District 9                                   |
| Sarah Mongano         | California State Lands Commission                                                     |
| Alex Estrella         | California State Parks                                                                |
| Arthur Heredia        | California State Parks                                                                |
| Chris Hon             | California State Parks                                                                |
| Elizabeth Freed       | California State Parks                                                                |
| Jessi Vannatta        | California State Parks                                                                |
| Leah Gardner          | California State Parks                                                                |
| Luis De Vera          | California State Parks                                                                |
| Scott Soares          | California State Parks                                                                |
| Tricia Farmer         | California State Parks                                                                |
| Misty Hailstone       | Edwards Air Force Base (412th Civil Engineer Group Environmental Management Division) |
| Rick McNeill          | National Park Service                                                                 |
| Emma Lynch            | US Bureau of Land Management                                                          |

| Name            | Organization                                                     |
|-----------------|------------------------------------------------------------------|
| Judy Perkins    | US Bureau of Land Management                                     |
| Martin Oliver   | US Bureau of Land Management                                     |
| Felicia Sirchia | US Fish and Wildlife Service                                     |
| Anna Bonnette   | US Forest Service                                                |
| Laura Ashfield  | US Forest Service                                                |
| Scott Eliason   | US Forest Service                                                |
| Joseph Esparza  | US Forest Service (San Bernardino National Forest)               |
| Cynthia Hopkins | US Navy                                                          |
| Dylan Layfield  | US Navy (Naval Air Weapons Station China Lake)                   |
| Meghan Branson  | US Navy (Naval Facilities Engineering Systems Command Southwest) |

## Local Agency Meeting #2 Attendees

| Name               | Organization                               |
|--------------------|--------------------------------------------|
| Hannah Weinberger  | Ascent                                     |
| Jessie Quinn       | Ascent                                     |
| Tracy Prybyla      | Ascent                                     |
| Clark Blanchard    | California Department of Fish and Wildlife |
| Cristin Walters    | California Department of Fish and Wildlife |
| Drew Kaiser        | California Department of Fish and Wildlife |
| Isabel Baer        | California Department of Fish and Wildlife |
| Kelley Barker      | California Department of Fish and Wildlife |
| Lani Maher         | California Department of Fish and Wildlife |
| Mariel Boldis      | California Department of Fish and Wildlife |
| Nyeka Allen        | City of Adelanto                           |
| Anu Doravari       | City of California City                    |
| Andrew Lemke       | City of Hesperia                           |
| Tammy Pelayes      | City of Hesperia                           |
| Megan Taggart      | City of Palmdale                           |
| Alex Jauregui      | City of Victorville                        |
| Markus Spiegelberg | ICF                                        |
| Lorraine Acuna     | Los Angeles County                         |
| Caroline Chen      | Los Angeles County Planning                |
| Mark Herwick       | Los Angeles County Planning                |
| Casey Escutia      | Riverside County                           |
| Harry Sandoval     | Riverside County                           |
| AJ Gerber          | San Bernardino County                      |
| Fabian Villenas    | San Bernadino County                       |

| Name             | Organization                                       |
|------------------|----------------------------------------------------|
| Jai Cheng        | San Bernardino County                              |
| Nancy Sansonetti | San Bernardino County                              |
| Ayida Smith      | San Bernardino County Department of Public Works   |
| Karen Carter     | San Bernardino County Department of Public Works   |
| Manie Cruz       | San Bernardino County Department of Public Works   |
| Lacy Blackwell   | San Bernardino County Office of Emergency Services |

## California State Lands Commission Meeting #1 Attendees

| Name              | Organization                               |
|-------------------|--------------------------------------------|
| Curtis Alling     | Ascent                                     |
| Hannah Weinberger | Ascent                                     |
| Jessie Quinn      | Ascent                                     |
| Cristin Walters   | California Department of Fish and Wildlife |
| Drew Kaiser       | California Department of Fish and Wildlife |
| Jeb Bjerke        | California Department of Fish and Wildlife |
| Drew Simpkin      | California State Lands Commission          |
| Sarah Mongano     | California State Lands Commission          |

## California State Parks Meeting #3 Attendees

| Name              | Organization                               |
|-------------------|--------------------------------------------|
| Curtis Alling     | Ascent                                     |
| Hannah Weinberger | Ascent                                     |
| Jessie Quinn      | Ascent                                     |
| Cristin Walters   | California Department of Fish and Wildlife |
| Drew Kaiser       | California Department of Fish and Wildlife |
| Isabel Baer       | California Department of Fish and Wildlife |
| Jeb Bjerke        | California Department of Fish and Wildlife |
| Mariel Boldis     | California Department of Fish and Wildlife |
| Arthur Heredia    | California State Parks                     |
| Christopher Hon   | California State Parks                     |
| Jessica Vannatta  | California State Parks                     |
| Leah Gardner      | California State Parks                     |
| Luis DeVera       | California State Parks                     |
| Madison Eklund    | California State Parks                     |
| Melissa Patten    | California State Parks                     |
| Patricia Farmer   | California State Parks                     |



| Name               | Organization           |
|--------------------|------------------------|
| Poya Kouchesfahani | California State Parks |
| Ron Melcer         | California State Parks |
| Russ Bradley       | California State Parks |
| Scott Soars        | California State Parks |

## California Department of Forestry and Fire Protection Meeting #1 Attendees

| Name              | Organization                                                                |
|-------------------|-----------------------------------------------------------------------------|
| Curtis Alling     | Ascent                                                                      |
| Hannah Weinberger | Ascent                                                                      |
| Cristin Walters   | California Department of Fish and Wildlife                                  |
| Drew Kaiser       | California Department of Fish and Wildlife                                  |
| Elliot Chasin     | California Department of Fish and Wildlife                                  |
| Jeb Bjerke        | California Department of Fish and Wildlife                                  |
| Mariel Boldis     | California Department of Fish and Wildlife                                  |
| Mika Samoy        | California Department of Fish and Wildlife                                  |
| Carol Snow        | California Department of Forestry and Fire Protection (San Bernardino Unit) |
| Davis Haas        | California Department of Forestry and Fire Protection (San Bernardino Unit) |

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# Appendix C.

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## Tribal Input Summary Memo





# Memo



Piñon Heritage Solutions LLC  
3733 E. Pacific Avenue  
Sacramento, CA 95820  
916.926.2736



ASM Affiliates  
2034 Corte Del Nogal  
Carlsbad, CA 92011  
760.804.5757

**Date:** May 12, 2025

**To:** Drew Kaiser, Isabel Baer, Cristin Walters, Jeb Bjerke, Mariel Boldis, Mika Samoy, CDFW

**From:** Diana T. Dyste, MA, RPA, Dr. Elizabeth Bagwell, RPA, and Lucien David Osas – Piñon Heritage Solutions LLC  
Brian Williams, MMA, RPA – ASM Affiliates

**Subject:** Tribal Input Summary, Western Joshua Tree Conservation Plan

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Piñon Heritage Solutions LLC (Piñon) and ASM Affiliates (ASM) respectfully submit the Tribal input summary presented herein as part of the Western Joshua Tree Conservation Plan (Conservation Plan) preparation. This summary includes information about the California Department of Fish and Wildlife's (CDFW) outreach process to California Native American tribes (Tribes) who are identified as being culturally affiliated with the habitat of the Joshua tree in California, and a list of Tribes who have responded in the affirmative that they are interested in participating in government-to-government consultation with CDFW or non-governmental collaborative tribal meetings with the Native American Land Conservancy (NALC). CDFW and NALC are engaged in an ongoing process of consultation, communication, and collaboration with Tribes, and as such, a summary of preliminary ideas from Tribes and broad ideas about potential Tribal co-management strategies is included.

This memorandum has been prepared in partial fulfillment of CDFW's Tribal Communication and Consultation Policy and is considered a living document. Forthcoming meeting notes from CDFW, NALC, and other parties engaging with Tribes, as well as future meetings and associated principles, methods, and strategies for Joshua tree co-management will be incorporated in updated memoranda when the Conservation Plan is updated or amended in the future. A central purpose of this memorandum is to document California Native American Tribal outreach efforts completed by CDFW and NALC during development of the Conservation Plan Tribal Co-Management sections occurring from October 2023 to April 2025 (see Section 1.3.2, "California Native American Tribes", and Section 5.3.3, "Tribal Co-Management").

## CDFW OUTREACH PROCESS

CDFW began the outreach process with the goal of identifying California Native American Tribes who may have an interest in Tribal co-management of the western Joshua tree and its habitat. To accomplish this, CDFW requested an AB 52 Tribal Consultation List, a Statewide Tribal Contact List, and a Sacred Lands File search for the region encompassing the proposed California western Joshua tree habitat from the Native American Heritage Commission (NAHC). As the NAHC contact lists were in preparation, the consulting firms (Piñon and ASM) hired by Ascent Environmental to assist CDFW with Tribal engagement, provided their current lists of Native American contacts for Tribes within the western Joshua tree habitat, or who were thought to have potential cultural traditions that involve use of western Joshua tree. The contact list from NAHC was received on December 4, 2023 and added to the ASM/Piñon Native American contact list to create a single master tribal contacts list. A subsequent contact list provided by CDFW Department Tribal Liaison, Sarah Fonseca, in February 2025 was used to update the Native American contact list for future mailings.

The CDFW engaged with Tribes through the following events and forms of communication:

- Initial outreach to Tribes
  - CDFW emailed information about the Western Joshua Tree Conservation Act and Tribal Co-Management coordination, to the initial contacts provided by Piñon and ASM on 10/12/2023 and invited them to view an online recorded CDFW video presentation about the Conservation Plan (see Attachment 1 to this memorandum).
  - ASM mailed hardcopy letters to the initial contact list provided by Piñon and ASM on 10/18/2023.
  - Piñon and ASM made follow up calls between 10/23/2023 and 10/27/2023.
- Invitation to participate in a live, online tribal listening session
  - CDFW emailed informational letters on 11/27/2023. The letters included details about the prerecorded CDFW video (e.g. under initial outreach) and the tribal listening session. The emails were sent by CDFW to the list of contacts provided by Piñon and ASM.
  - ASM mailed hardcopy letters to the initial contacts provided by Piñon and ASM on 12/1/2023.
  - CDFW emailed informational letters to the additional contacts provided by the NAHC on 12/5/2023.
  - ASM mailed hardcopy letters to the additional NAHC contacts on 12/7/2023.



- Piñon and ASM made follow up calls to the master tribal contact list between 12/5/2023 and 12/12/2023.
- CDFW sent a reminder email about the online tribal listening session on 12/14/2023.
- CDFW held a live, online tribal listening session on 12/14/2023.
- Written Letters "Notification of the Development of a western Joshua tree conservation plan pursuant to the Western Joshua Tree Conservation Act" were sent to all listed in the master tribal contacts list.
- CDFW emailed Notification Letters on 2/22/2024.
- ASM mailed hardcopy Notification Letters on 3/4/2024.
- Piñon and ASM made follow-up calls to all Tribes on the master tribal contact list from 3/19/2024 to 4/12/2024.
- The NALC began facilitating in-person, virtual, and telephone non-governmental collaborative meetings with Tribes on 5/9/2024. These are ongoing.
- CDFW began meeting with interested Tribes for one-on-one informational meetings or government-to-government consultation on 5/24/2024. These are ongoing.
- Emails labeled, "WJT Community Workshop – October 26, 2024," were sent to select Tribes included in the master tribal contacts list.
- NALC emailed Notification Letters between 9/20/2024 and 10/15/2024.
- NALC followed up with an email to Tribal members who had RSVP'd on 10/22/2024.
- The CDFW, NALC, and interested Tribes met in person for a site visit to western Joshua tree habitat in the town of Lone Pine on 10/26/2024. Topics discussed at this meeting included installation of interpretative signage in areas populated with western Joshua tree; establishing an intertribal coalition to integrate Tribes' voices in contributing to the Conservation Plan; land opportunities and land prioritization for Tribes such as co-management, nursery establishment, and involvement of Tribal monitors to assist with western Joshua tree protection during development; and western Joshua tree ecology, biology, horticulture, Tribal Environmental Knowledge or Tribal Ecological Knowledge, and Tribal Ecological Practices. Representatives from the following Tribes attended the meeting:
  - Chemehuevi Indian Tribe
  - Kern Valley Indian Community
  - San Gabriel Band of Mission Indians
  - Fernandeño Tataviam Band of Mission Indians

- San Manuel Band of Mission Indians
- Big Pine Paiute Tribe of the Owens Valley
- Gabrielino-Tongva Tribe/Pit River
- Lone Pine Paiute Shoshone Tribe
- Fort Yuma Quechan Indian Tribe
- Emails labeled, "WJTCW - Two Day Event (02/21-02/22)," were sent to select Tribes included in the master Tribal contacts list.
  - NALC emailed Notification Letters between 1/24/2025 and 2/19/2025.
  - NALC followed up with an email to tribal members who had RSVP'd on 2/19/2025.
- CDFW, NALC, and interested Tribes met in person or virtually for a two-day workshop in the community of Joshua Tree on 2/21/2025 and in the town of Yucca Valley on 2/22/2025. During the first day of the workshop, staff from the Mojave Desert Land Trust (MDLT) led a tour of their nursery and seedbank. Staff from MDLT, The Wildlands Conservancy, and CDFW led tours of preserves and other properties with western Joshua trees. During the second day, staff from CDFW, NALC, US Fish and Wildlife Service, Center for Biological Diversity, and Joshua Tree National Park shared presentations on Western Joshua Tree Conservation Plan updates, potential grant opportunities, Inter-Tribal coalitions, the Western Joshua Tree Conservation Act and California Endangered Species Act listings, range-wide conservation agreements, and National Park Service research, conservation, and partnerships. Representatives from the following Tribes attended one or both days of the workshop.
  - Agua Caliente Band of Cahuilla Indians
  - Cahuilla Band of Indians
  - Fort Yuma Quechan Indian Tribe
  - Kern Valley Indian Community
  - Twenty-Nine Palms Band of Mission Indians
  - Tübatulabals of Kern Valley

## CALIFORNIA NATIVE AMERICAN TRIBES AND INDIVIDUALS PARTICIPATING IN JOSHUA TREE CO-MANAGEMENT DISCUSSIONS

The following eighteen (18) Tribes and one individual are participating in co-developing the principles, approach, and elements of Tribal co-management of western Joshua tree conservation in consultation with CDFW at various stages of the Conservation Plan preparation:

- Agua Caliente Band of Cahuilla Indians
- Agua Caliente Tribe of Cupeño Indians
- Cahuilla Band of Indians
- Carmen Lucas, Native American individual
- Chemehuevi Indian Tribe
- Fernandeano Tataviam Band of Mission Indians
- Fort Independence Indian Community of Paiute Shoshone
- Fort Mojave Indian Tribe
- Fort Yuma Quechan Indian Tribe
- Gabrieleno San Gabriel Band of Mission Indians
- Kern Valley Indian Community
- Kwaaymii Laguna Band of Mission Indians
- Lone Pine Paiute-Shoshone Tribe
- Pala Band of Mission Indians
- Rincon Band of Luiseño Indians
- Tejon Indian Tribe
- Tübatulabals of Kern Valley
- Tule River Indian Tribe
- Twenty-Nine Palms Band of Mission Indians

## PRELIMINARY CDFW/TRIBAL CO-MANAGEMENT IDEAS

CDFW, NALC, and the eighteen Tribes and individual identified above are actively engaged in ongoing discussions about the Western Joshua Tree Conservation Act and Conservation Plan. Discussions are focused on defining the best approach to planning and implementing feasible Conservation Plan Tribal Co-Management strategies. These may include, but are not limited to, Tribal programming, funding, co-developing western Joshua tree conservation policies, and exploring ways to gather culturally significant data. The bulleted list below summarizes the conversational topics that emerged during the initial meetings between Tribes and CDFW or the NALC. This list is not exhaustive and is expected to become more detailed and refined as additional meetings are held between Tribes and CDFW or NALC. Topics include:

- Strategies for more effective controlled burning and reduction of fuel loads to help regeneration in post-fire conditions.
- Strategies for acquiring additional land across the western Joshua tree habitat for mitigation purposes with a focus on preserving genetically diverse stands.
- Funding a co-equal partnership between CDFW and Tribes, including Tribal facilities for mitigation efforts, funding for Tribal members to co-manage lands on an ongoing basis, and providing training for Tribal members interested in becoming co-managers.
- Setting permit fees to cover costs associated with mitigation or establishing a mitigation fund to buy land for mitigation, with developers or other sources contributing to the fund.
- Providing Tribes with funding and staff capacity support to grow western Joshua trees for mitigation, and to receive trees during relocation/transplanting.
- Providing Tribal members with training in western Joshua tree monitoring and desert native plant specialist certification.
- Develop, fund, and administer western Joshua tree conservation-focused Tribal youth programs or activities.
- Including project provisions to have Tribal cultural monitors on site for ground disturbing activities involving take of western Joshua trees, and to provide prayer rituals for the removal and relocation of western Joshua trees.
- Thinking more broadly about mitigation to include high country habitat and modification of development plans to account for preserving western Joshua trees in situ.
- Thinking holistically about supporting plants, insects, and animals that help ensure western Joshua trees' survival or enhance a suitable habitat.
- Conducting a habitat-wide ethnographic study of Tribes values, use, and management of western Joshua tree habitat.
- Funding additional cooperative research on western Joshua tree growth patterns and habitat needs in various conditions, including fire impacts in various landscapes, germinating western Joshua tree in post-fire soil conditions, and understanding better the thresholds for wind and water exposure.
- Completing a review of spring development and sustainability of water sources within western Joshua tree habitat and conservation lands, including consideration of Tribal water rights and access to water within lands they are being asked to hold in trust for mitigation.
- Supporting restoration of Tribal knowledge through funding and programming related to western Joshua tree and traditional use of the plant.

- Working towards adopting and implementing foundational commitments adapted from the state-applicable Policy Principles outlined in the March 2024 “Advisory Council on Historic Preservation’s Policy Statement on Indigenous Knowledge and Historic Preservation” (Available at: <https://www.achp.gov/sites/default/files/policies/2024-03/PolicyStatementonIndigenousKnowledgeandHistoricPreservation21March2024.pdf>).

While Tribes are interested in holding additional conservation lands, the Tribes encourage balance and restraint in developing an approach that adequately provides funding to manage the newly acquired lands through new/additional hires.

## CONCLUSION

CDFW’s Tribal outreach and consultation efforts will be ongoing throughout the duration of the Western Joshua Tree Conservation Plan. The Conservation Plan has a process for amending future drafts with Traditional Ecological Knowledge that may come forward after the Conservation Plan is finalized. CDFW is committed to continuing this engagement with Tribes and that commitment will be codified in the co-management strategies and communication processes being developed. As more Tribes confirm participation in the Conservation Plan, their names will be added to this memorandum.



## Attachment 1. Tribes Contacted to participate in the Conservation Plan development

|                                                            |                                                          |
|------------------------------------------------------------|----------------------------------------------------------|
| Agua Caliente Band of Cahuilla Indians                     | Elk Valley Rancheria                                     |
| Agua Caliente Tribe of Cupeño Indians                      | Enterprise Rancheria of Maidu Indians                    |
| Augustine Band of Cahuilla Indians                         | Ewiiapaayp Band of Kumeyaay Indians                      |
| Barbareño Band of Chumash Indians                          | Federated Indians of Graton Rancheria                    |
| Barbareño/Ventureño Band of Mission Indians                | Fernandeño Tataviam Band of Mission Indians              |
| Barona Band of Mission Indians                             | Fort Independence Indian Community of Paiute Indians     |
| Bear River Band of Rohnerville Rancheria                   | Fort Mojave Indian Tribe                                 |
| Big Pine Paiute Tribe of the Owens Valley                  | Fort Yuma Quechan Indian Tribe                           |
| Big Sandy Rancheria of Western Mono Indians                | Gabrieleño Band of Mission Indians - KIZH Nation         |
| Big Valley Band of Pomo Indians                            | Gabrieleno/Tongva San Gabriel Band of Mission Indians    |
| Bishop Paiute Tribe                                        | Gabrielino/Tongva Nation                                 |
| Blue Lake Rancheria Tribe of Indians                       | Gabrielino-Tongva Indian Tribe                           |
| Bridgeport Paiute Indian Colony                            | Gabrieleno Tongva Indians of California Tribal Council   |
| Buena Vista Rancheria of Me-Wuk Indians                    | Habematolel Pomo of Upper Lake                           |
| Cabazon Band of Mission Indians                            | Hoopa Valley Tribe                                       |
| Cahuilla Band of Indians                                   | Hopland Band of Pomo Indians                             |
| Calaveras Band of Mi-Wuk Indians                           | Iipay Nation of Santa Ysabel                             |
| Calaveras Band of Mi-Wuk Indians - Grimes                  | Inaja-Cosmit Band of Indians                             |
| California Valley Miwok Tribe                              | Jamul Indian Village                                     |
| Campo Band of Kumeyaay Indians                             | Juaneño Band of Mission Indians                          |
| Chemehuevi Indian Tribe                                    | Juaneño Band of Mission Indians                          |
| Cher-Ae Heights Indian Community of the Trinidad Rancheria | Acjachemen Nation - Belardes                             |
| Chicken Ranch Rancheria of Me-Wuk Indians of California    | Juaneño Band of Mission Indians                          |
| Chumash Council of Bakersfield                             | Acjachemen Nation 84A                                    |
| Coastal Band of the Chumash Nation                         | Karuk Tribe                                              |
| Cocopah Indian Tribe                                       | Kashia Band of Pomo Indians of Stewart's Point Rancheria |
| Cold Springs Rancheria of Mono Indians of California       | Kern River Paiute Council                                |
| Colorado River Indian Tribes                               | Kern Valley Indian Community                             |
| Death Valley Timbisha Shoshone Tribe                       | Kitanemuk & Yowlumne Tejon Indians                       |
| Dry Creek Rancheria Band of Pomo Indians                   | Kwaaymii Laguna Band of Mission Indians                  |
| Dumna Wo-Wah Tribal Government                             | La Jolla Band of Luiseño Indians                         |
| Dunlap Band of Mono Indians                                | La Posta Band of Diegueño Mission Indians                |
| Elem Indian Colony                                         | Lone Pine Paiute-Shoshone Tribe                          |

Los Coyotes Band of Cahuilla and Cupeño  
Indians  
Manzanita Band of Kumeyaay Nation  
Mechoopda Band of Chico Rancheria  
Mesa Grande Band of Diegueño Mission  
Indians  
Middletown Rancheria of Pomo Indians  
Mission Creek Band of Mission Indians  
Monache Intertribal Association  
Mono Lake Kootzaduka'a Tribe  
Mooretown Rancheria of Maidu Indians  
Morongo Band of Mission Indians  
Nashville-Enterprise Miwok-Maidu-Nishinam  
Tribe  
North Fork Mono Tribe  
North Fork Rancheria of Mono Indians of  
California  
Northern Chumash Tribal Council  
Northern Valley Yokut / Ohlone Tribe  
Owens Valley Career Development Center  
Pala Band of Mission Indians  
Paskenta Band of Nomlaki Indians  
Pauma Band of Luiseño Indians  
Pechanga Band of Indians  
Picayune Rancheria of the Chukchansi  
Indians  
Pinoleville Pomo Nation  
Pit River Tribe  
Ramona Band of Cahuilla  
Rincon Band of Luiseño Indians  
Round Valley Indian Tribe  
Salinan Tribe of San Luis Obispo and  
Monterey Counties  
San Fernando Band of Mission Indians  
San Luis Rey Band of Mission Indians  
San Manuel Band of Mission Indians  
San Pasqual Band of Mission Indians  
Santa Rosa Band of Cahuilla Indians

Santa Rosa Rancheria Tachi Yokut Tribe  
Santa Ysabel Band of the Lipay Nation  
Santa Ynez Band of Chumash Indians  
Serrano Nation of Mission Indians  
Sherwood Valley Band of Pomo Indians of  
California  
Shingle Springs Band of Miwok Indians  
Soboba Band of Luiseño Indians  
Southern Sierra Miwuk Nation  
Susanville Indian Rancheria  
Sycuan Band of the Kumeyaay Nation  
Table Mountain Rancheria  
Tejon Indian Tribe  
Timbisha Shoshone Tribe  
Tolowa Dee-ni' Nation  
Tongva Ancestral Territorial Tribal Nation  
Torres-Martinez Desert Cahuilla Indians  
Traditional Choinumni Tribe  
Tübatulabals of Kern Valley  
Tule River Indian Tribe  
Tuolumne Band of Me-Wuk Indians  
Twenty-Nine Palms Band of Mission Indians  
United Auburn Indian Community of the  
Auburn Rancheria  
Utu Utu Gwaitu Tribe of the Benton Paiute  
Reservation  
Viejas Band of Kumeyaay Indians  
Walker River Paiute Tribe  
Washoe Tribe of Nevada and California  
Wilton Rancheria  
Wiyot Tribe - Table Bluff Reservation  
Wuksache Indian Tribe/Eshom Valley Band  
Xolon Salinan Tribe  
yak tityu tityu yak tithini – Northern Chumash  
Tribe  
Yocha Dehe Wintun Nation  
Yuhaaviatam of San Manuel Nation  
Yurok Tribe

# Appendix D.

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## Avoidance and Minimization Best Management Practices and Guidelines



# AVOIDANCE AND MINIMIZATION BEST MANAGEMENT PRACTICES AND GUIDANCE

The Avoidance and Minimization (A&M) Actions in this Appendix provide additional guidance and best management practices for several Actions in Chapters 5, “Conservation Management Actions and Effectiveness Criteria,” Section 5.2.1, “Impact Avoidance and Minimization,” with the corresponding A&M number and action title.

## Action A&M 1.3.1: Avoid Impacts during Pesticide Application

Project proponents, landowners, land managers, and agencies should not apply pesticides on western Joshua trees and should implement best management practices that avoid pesticide drift onto western Joshua trees, nontarget vegetation (e.g., nurse plants), pollinators, or seed-dispersing rodents. Pesticides are chemicals that are used to control pests. Types of pesticides include herbicides, which aim to destroy or control unwanted vegetation, and insecticides, which aim to kill or control insects. Best management practices include:

1. Prior to pesticide treatment applications, western Joshua trees and buffer zones should be flagged or otherwise marked within treatment areas in western Joshua tree habitat.
2. No pesticide application should occur during precipitation or if precipitation is forecasted 24 hours before or after project activities, or as required by the label.
3. No ground disturbance or insecticide/larvicide use should occur within the dripline (i.e., perimeter edge of tree canopy) of a mature (i.e., reproductive) tree, which includes the tree itself, to avoid impacts on yucca moth pollinators.

However, pesticide application may be useful for the conservation and recovery of western Joshua tree (see Action LC&M 4.3, “Develop and Implement Restoration/Enhancement Plans”).

## Action A&M 2.5.1: Minimize Impacts from Invasive Plants

Project proponents, landowners, land managers, and agencies should implement best management practices to prevent the spread of invasive plants (Cal-IPC 2012) for all activities that have the potential to spread invasive species in western Joshua tree habitat (e.g., construction and resource extraction, off-highway vehicle (OHV) use, outdoor recreation, fire control and suppression, fuel treatment implementation, and grazing). Invasive plant management includes the following best management practices:



1. A pre-activity assessment should be conducted to determine which activities could spread invasive species and which best management practices are applicable to the site.
2. Vehicles, equipment, and personnel should be inspected and cleaned if they have propagules (i.e., plant parts that can become detached and give rise to a new plant) or materials that may contain propagules (e.g., mud).
3. Inspections should be done when vehicles first arrive at a site and periodically during the activity (e.g., fire suppression, development, restoration project).
4. All clothing, boots, and equipment should be inspected for soil and invasive plant material and should be cleaned before arriving in western Joshua tree habitat.
5. Invasive plant material should be disposed of appropriately outside of western Joshua tree habitat.
6. Vegetation and soil disturbance should be minimized.
7. Weed-free feed for stock animals should be used in western Joshua tree habitat.
8. Local personnel should be contacted to gather information on the locations of high priority invasive plants or to survey sites for their presence.
9. Awareness training should be provided to project personnel about avoiding known areas infested with invasive plants at the beginning of each day.
10. Establishing staging areas (e.g., fire camps, landings for helicopters, camps, laydown yards) in areas infested by high priority invasive plants should be avoided.
11. If infestations of high priority invasive plants occur within or near staging areas, their perimeters should be identified so vehicle and foot traffic can avoid them.
12. Using water from impoundments infested with invasive plants should be avoided, such as when watering western Joshua tree plantings or conducting fire suppression activities.

### **Action A&M 2.6.1: Minimize Impacts during Pesticide Application**

Project proponents, landowners, land managers, and agencies should implement best management practices that minimize pesticide drifting onto western Joshua trees and other nontarget vegetation (e.g., nurse plants). Best practices include:

1. Pesticide use should be limited to targeted ground application (e.g., backpack/hand sprayed application, down-directed ground spray from small vehicles) within western Joshua tree avoidance buffer zones using the minimum amount required to be effective (Figure 5-1 in Chapter 5).





2. Broadcast or aerial spray of pesticides will not occur.
3. Western Joshua tree and nontarget plant species should be physically avoided during pesticide application by methods such as physically avoiding the plant and nurse plants, avoiding application on high heat or windy days to avoid volatilization (i.e., liquid converting to gas), and adjusting the nozzle and pressure to make bigger droplets to avoid pesticide drift.
4. A spill kit and safety plan should be on-site during herbicide treatments in western Joshua tree habitat. Immediate control, containment, and cleanup of fluids and pesticides due to spills or equipment failure (e.g., broken hose, punctured tank) should be implemented.
5. Cleaning and disposal of pesticide containers should be done in compliance with federal, state, and local laws, regulations, directives, and should avoid western Joshua tree, nurse plants, and pollinators.
6. Pesticide applicators should be certified and should comply with all label instructions and restrictions for use.
7. The use of pesticides for the conservation and recovery of western Joshua tree should be considered and applied according to product labels. For example, indaziflam is labeled for use in natural areas, including parks, open spaces, wildlife management areas, recreational areas, fire rehabilitation areas, and fuel breaks. This treatment method is being implemented at Joshua Tree National Park where treatment has not significantly affected established perennial vegetation and successfully controls annual grasses for up to 3 years after application (NPS 2022).

### **Action A&M 3.2.1: Minimize Impacts from Fire Suppression**

While land managers and fire agencies should aggressively fight active wildland fires in or near western Joshua tree habitat to minimize loss of western Joshua trees, such activities can also cause direct and indirect impacts on western Joshua trees and their habitats. Land managers and fire agencies should minimize direct and indirect impacts on western Joshua tree during fire suppression and control activities when safe and feasible. Minimum Impact Suppression Techniques (MIST) and Best Management Practices are only to be considered when it does not threaten the safety of firefighters and can include (Interagency Joshua Tree Biological Working Group 2023):

1. Implementation of fire lines and staging areas should occur away from mature western Joshua trees when safe and feasible. Preference should be given, when safe and feasible, to the installation of smaller handlines and wet lines (i.e., control line installed by spraying water in the unburned areas surrounding the fire) as opposed to black lines (i.e., burned line) or dozer lines (i.e., lines constructed with bulldozers). Firefighters should seek to



minimize amount of retardant drop, if safe, feasible, and in alignment with the tactical suppression plan. Furthermore, when safe and feasible, all clothing and equipment of firefighter personnel should be cleaned before going into the field to reduce the spread of invasive species.

2. Off-road driving or heavy equipment use may be justified to avoid much greater total damage to habitat burned. Resource Advisors or Agency Administrators, or other appropriate CDFW or California Department of Forestry and Fire Protection (CAL FIRE) staff, should always be consulted before using heavy equipment or off-road driving in western Joshua tree habitat. All heavy equipment use or off-road driving should have a ground guide walking in front of the vehicles to watch for Joshua tree juveniles and seedlings.
3. Fire lines should utilize preexisting fuel breaks (e.g., bare rock and managed fuel zones), roads, or fire lines from past fire suppression, when feasible and present on the landscape.
4. Stop all habitat damaging tactics as soon as they are no longer required to prevent a larger or more severe fire. Constantly assess the fire situation and priorities for 1) ensuring firefighter and human safety, 2) minimizing acres burned through fire suppression, and 3) minimizing damage to western Joshua tree and their habitat from suppression as they relate to the operation. Document actions taken during suppression activities to facilitate postfire rehabilitation of suppression actions.
5. Vehicles, equipment, and personnel should be inspected and cleaned to reduce the potential for them to disperse invasive species into burned areas (see Action A&M 2.5, “Minimize Impacts from Invasive Plants,” [in Chapter 5] and Action A&M 2.5.1, above, for guidance).

### **Action A&M 3.3.1: Minimize Impacts from Postfire Rehabilitation**

In consultation with CDFW, land managers should develop and implement measures to minimize direct impacts on western Joshua trees when rehabilitating burned areas after a wildland fire. This could include the following elements:

1. A postfire monitoring plan for invasive plants, focusing on populations of high priority invasive plants known to exist before the fire and on areas of significant fire management activity during the fire (e.g., fire camps, dozer lines) should be implemented.
2. Invasive plant control:
  - a. New populations of invasive species should be identified and eradicated or contained to prevent spread across the postfire landscape.
  - b. A monitoring and re-treatment plan for invasive plants should be implemented after the initial treatments are applied.



3. Exposed soil created during fire line construction should be covered with a thin layer of organic mulch (e.g., chipped fuels, hydromulch) less than 3 cm (1.2 inch) in height to promote microbial activity that will use nitrogen and phosphorus, thus reducing their availability to invading plants (Brooks 2008).
4. Revegetation:
  - a. Avoid use of nitrogen-fixing plants in landscapes where increased nitrogen may create conditions for invasive plant colonization.
  - b. Revegetating with native species should be prioritized, if feasible. Revegetating with fast-growing but noninvasive species should be considered to increase the uptake of resources that would otherwise be utilized by invasive species (Brooks 2008).
  - c. Seed mixes or other types of revegetation materials should be tested to ensure that they are not contaminated by invasive species.
5. Postfire land uses that may reduce vigor of western Joshua tree resprouting or establishment of native plants (e.g., livestock grazing) while the ecosystem recovers from the disturbance should be minimized. Ecosystem recovery postfire can vary even within geographically similar vegetation communities (Engel and Abella 2011), so recovery should be determined on a site-by-site basis.
6. Public access to burned areas should be closed to minimize damage to western Joshua tree and nurse plant propagules already stressed by fire.
7. Vehicles, equipment, and personnel should be prevented from dispersing invasive species into burned areas (see Action A&M 2.5 and Action 2.5.1, above, for guidance).

### **Action A&M 3.4.1: Minimize Accidental Ignition of Fires**

Best practices should be implemented during construction and outdoor recreation activities to reduce the potential for accidental ignition of wildland fires. When construction activities occur in western Joshua tree habitat, fire extinguishers, backpack sprayers, water trailers, or water tenders equipped with hoses should be available to suppress accidental ignitions during hot, dry, or windy conditions. Additionally, best practices should be implemented to reduce the potential for construction and outdoor recreation activities to result in accidental ignition of vegetation:

1. Staging areas should be limited to areas that are naturally void of vegetation or that are cleared prior to use, to reduce the risk of hot equipment and vehicles causing accidental ignitions.



2. To the extent feasible, vehicles and heavy equipment should be limited to already cleared access roads. If heavy equipment must exit access roads to perform construction activities, a designated monitor should be onsite with appropriate resources to quickly extinguish any accidental ignitions.
3. Land managers and regulating agencies should enforce campfire restrictions both outside of and within developed campgrounds in western Joshua tree habitat during hot, dry, and windy conditions or certain portions of the year (e.g., fire season).
4. Land managers and regulating agencies should encourage OHV recreationists to carry fire extinguishing devices when traveling in and around western Joshua tree habitat.

### Action A&M 3.5.1: Implement Fuel Treatments

Guidance for best management practices to avoid impacts on western Joshua tree and its habitat during fuel treatments include:

1. Fuel break construction in or adjacent to western Joshua tree habitat can take or damage trees. If feasible, fuel breaks should not be installed within 56.7 meters (186 feet) of western Joshua tree individuals in order to protect nurse plants, seedlings, and the seedbank.
2. If feasible, wildland-urban interface (WUI) fuel reduction treatments should be focused on removing vegetation outside of a 56.7-meter (186-foot) buffer zone around western Joshua tree individuals to reduce fuel continuity and reestablish the composition and structure of the ecosystem in western Joshua tree habitat.
3. Biological staff working with fuel treatment crews should survey treatment areas and flag western Joshua trees prior to fuel treatment implementation. Biological staff should train crews to identify western Joshua trees at different life stages (e.g., seedling, juvenile, adult, resprouts) and likely places to find them (i.e., under nurse plants). Additionally, specific measures should be implemented to avoid potential impacts on the root system and seedbank of individual western Joshua trees such as avoiding soil disturbance, use of manual treatment methods (i.e., use of hand tools both motorized and nonmotorized including chainsaws, but no use of heavy equipment such as dozers or masticators) to remove dead, woody debris, and use of manual or chemical treatment methods to remove or control invasive species.

Guidance to minimize impacts on western Joshua tree and its habitat during fuel treatment implementation includes:

1. Herbicide application should be conducted according to Actions A&M 1.3.1 and 2.6.1 above, and Actions A&M 1.3, "Avoid Impacts during Pesticide Application," and A&M 2.6, "Minimize Impacts during Pesticide Application" in Chapter 5.



2. Prescribed herbivory (i.e., intentional use of domestic livestock to remove, rearrange, or convert vegetation) may be considered to reduce fuel loads in some situations. However, grazing in western Joshua tree habitat should be guided by the minimization measures for grazing described in Action A&M 2.7, "Minimize Impacts from Grazing Activities."
3. Existing dirt roads in western Joshua tree habitat should be maintained and cleared of vegetation within their existing footprint so they may act as effective fuel breaks and allow access if a fire were to occur.
4. If a fuel break is installed, it should use and connect with existing fuel breaks, roads, or old fire lines from past fire events when present on the landscape, to the extent feasible.
5. If western Joshua tree removal is necessary to maintain defensible space or implement WUI fuel reduction treatments, project proponents must obtain take authorization. Organizations implementing fuel treatments should consult with CDFW or other agency administrators to determine the most appropriate type of take authorization and how best to protect western Joshua tree individuals and populations within the project area while still meeting project objectives.
6. If WUI fuel reduction treatments require removal of vegetation other than western Joshua tree within the western Joshua tree avoidance buffer zone to successfully reduce fuel continuity, only manual treatment methods should be used. Additionally, specific measures should be implemented to reduce potential impacts on the root system and seedbank of individual western Joshua trees such as limiting soil disturbance, limiting removal of vegetation to a certain percentage of the vegetation, or avoiding removal of certain nurse plant species such as blackbrush (*Coleogyne ramosissima*) or creosote bush (*Larrea tridentata*).
7. If ecological restoration treatments require removal of vegetation within the western Joshua tree avoidance buffer zone to protect individual western Joshua trees from increased fuel loads and fuel depths, only invasive species or dead, woody debris should be removed. Additionally, specific measures should be implemented to reduce potential impacts on the root system and seedbank of individual western Joshua trees such as limiting soil disturbance, using manual treatment methods to remove dead, woody debris, and use of manual or chemical treatment methods to remove or control invasive species.
8. To minimize the spread of invasive species during fuel treatment implementation, vehicles, equipment, and personnel should be inspected and cleaned to prevent dispersal of invasive species into burned areas (see Action A&M 2.5 and Action 2.5.1, above, for guidance).
9. Land managers should work with local fire departments in the geographic focus area, the CAL FIRE, and the federal agencies to implement Action A&M 3.5.1 guidance.





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# Appendix E.

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## Relocation Guidelines and Protocols



"Pursuant to Fish and Game Code section 1927.3, subdivision (a)(4)(C), the California Department of Fish and Wildlife (Department) has adopted and amended guidelines and protocols, based on the best available science, to relocate western Joshua trees successfully. The current version of the relocation guidelines and protocols, adopted by the Department in May 2025, is included in the Western Joshua Tree Conservation Plan for informational purposes by way of this appendix, consistent with Fish and Game Code section 1927.6, subdivision (a). The Department may adopt further revisions to the guidelines and protocols pursuant to its authority under Fish and Game Code section 1927.3, subdivision (a)(4)(C). For the most current version of the guidelines and protocols, please refer to the Department's Western Joshua Tree Conservation website at <https://wildlife.ca.gov/Conservation/Environmental-Review/WJT>."



# Western Joshua Tree Relocation Guidelines and Protocols

April 2025



State of California  
Natural Resources Agency  
Department of Fish and Wildlife



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## Introduction

The California Department of Fish and Wildlife (CDFW) developed this document to govern how and when to relocate western Joshua trees (*Yucca brevifolia*) in order to minimize impacts to populations, prevent habitat fragmentation, and preserve connectivity corridors for gene flow and pollinator migration.

The Guidelines section of this document discusses the circumstances in which CDFW would consider including permit conditions requiring relocation of one or more western Joshua trees under the Western Joshua Tree Conservation Act (WJTCA). The Protocol section of this document provides a summary of best practices for relocating western Joshua trees and increasing the survival rate of relocated (salvage) western Joshua trees. Information on post-relocation maintenance, monitoring, and reporting is also provided. This document will be updated as needed based on the best scientific information available.

## Western Joshua Tree Conservation Act Relocation Provisions

Section 1927.3, subdivision (a) of the California Fish and Game Code gives CDFW authority to issue incidental take permits (ITPs) pursuant to the WJTCA so long as certain conditions are satisfied. Among other conditions, Section 1927.3, subdivision (a)(2) requires that a permittee “avoids and minimizes impacts to, and the taking of, the western Joshua tree to the maximum extent practicable.” Section 1927.3, subdivision (a)(2) expressly authorizes CDFW to include minimization measures in a WJTCA incidental take permit, which can include the requirement to relocate one or more western Joshua trees.

Pursuant to Section 1927.3, subdivision (a)(4)(A), where relocation is required, permittees must implement reasonable measures required by CDFW to facilitate the successful relocation and survival of salvage trees. Relocation is deemed successful where the health of a salvaged western Joshua tree is stable or improving without any supplemental care after the post-relocation maintenance period. The relocation measures shall include but are not limited to the following conditions:

1. Salvage trees are placed in locations and with proper orientation to improve their chances of survival.
2. Salvage trees are relocated at a time that maximizes their chances of survival, when feasible.
3. A desert native plant specialist be onsite to oversee relocation.

In addition, section 1927.3, subdivision (a)(4)(B) states that CDFW may limit relocation requirements to certain size classes of trees.

Pursuant to Section 1927.3, subdivision (g)(1), the permittee shall be legally responsible for ensuring the measures included in its WJTCA ITP are implemented consistent with these guidelines. The permittee may, however, contract with the landowner of the relocation site(s) to conduct the post-relocation maintenance and monitoring activities required under its WJTCA ITP.

Subdivision (g)(2) of that section further states, “[u]nless specifically required by written agreement, a landowner that agrees in writing to allow western Joshua trees to be relocated onto land it owns shall not be liable for the continued survival of the western Joshua trees, shall not be required to manage or maintain the translocated western Joshua trees, and shall not be required to change existing land use practices, provided that the land use practices do not result in the taking, possession, sale, or further translocation of the western Joshua trees.” While landowners accepting salvage trees are not responsible for maintaining the trees or otherwise ensuring the trees’ continued survival, it is important to note that salvage trees receive the full protection afforded to all western Joshua trees pursuant to the WJTCA and CESA and that import, export, take, possession, purchase, and sale of salvage trees or any part or product thereof, is prohibited, except as authorized pursuant to the WJTCA or CESA.

The WJTCA requires CDFW, by December 31, 2024, to prepare a Western Joshua Tree Conservation Plan for review and approval by the Fish and Game Commission that incorporates into the plan, among other provisions, protocols for the successful relocation of western Joshua trees. As such, these guidelines and protocols will be incorporated by reference into the Western Joshua Tree Conservation Plan.

## Definitions

The following definitions are used in this document:

Bare root relocation – method for relocating a living western Joshua tree by excavating around the root ball of the tree to dislodge the tree from the ground. Any relocation method other than tree spade relocation (defined below) is considered bare root relocation for the purposes of this document.

Containerize – to place a salvage tree into a container, such as a plastic pot or tree box, for temporary storage.

Project site – the area(s) where project activities are expected to occur (e.g., access, staging, construction, etc.)

Recipient site – a salvage tree's (defined below) final planting location.

Relocation – the removal of a living western Joshua tree from the ground and transplantation back into the ground at another location (referred to as a recipient site).

Relocation area – an area with one or several recipient sites.

Retained tree – a living western Joshua tree that is located within the project site that is being or has been avoided or, minimally impacted by the project and will not be relocated.

Root ball – a mass of soil that contains concentrated roots growing from the base of the stem of a western Joshua tree.

Salvage tree – a living western Joshua tree that is being, or has been, relocated. Each western Joshua tree stem or trunk arising from the ground shall be considered an individual tree, regardless of its proximity to any other western Joshua tree stem or trunk.

Size Class A – a western Joshua tree that is less than one meter in height.

Size Class B – a western Joshua tree that is one meter or greater, but less than five meters in height.

Size Class C – a western Joshua tree that is five meters or greater in height.

Tree spade – a specialized piece of heavy equipment that consists of hydraulically controlled spade blades that can encapsulate the root ball of a salvage tree, as well as adjacent soil.

Tree spade relocation – method for relocating a living western Joshua tree by using a tree spade to dig, transport, and replant a western Joshua tree and its root ball.

## Best Available Science on Relocation

There are many accounts of successful western Joshua tree relocation (i.e., stable or increasing signs of tree health without any supplemental care after a period of maintenance), but little scientific research has been done to compare the relative success rates for different relocation techniques. Rather, most relocation efforts that monitor salvage western Joshua tree survivorship evaluate



only one method of relocation (i.e., using hand tools for small trees and/or excavators or tree spade for large trees) (Wagner 2018, Balogh 2019, City of Palmdale 2024). The best available scientific information on how to achieve success when relocating western Joshua trees therefore comes from the experience of experts working in the field of restoration and Joshua tree relocation. In Bainbridge (2007), the author offers advice on relocating Joshua trees and other salvaged succulents, such as cacti and shrubs, based on their expertise and knowledge. The National Park Service (NPS) (Goodwin 2024) and a tree transplanting expert (Reynolds 2024) also provided CDFW with information relevant to the development of this document.

In addition, CDFW reviewed the results of known relocation projects. Bainbridge (2007) states that “Joshua trees often transplant well but require intensive aftercare and irrigation[.]” Bainbridge suggests that relocation is best done with machinery, but hand tools can also be used. Front loaders, excavators, and hydraulic tree spades are useful. Tree spades work best in silty or sandy soils but using them is difficult in rocky soils. Salvaged trees can be placed in containers or immediately replanted but should be protected as much as possible from drying winds, heat, and sun. Bainbridge (2007) also mentions that yucca, such as western Joshua trees, seem to survive better if replanted in the same orientation they grew. Overall, Bainbridge (2007) shows the survival rates for salvage trees can be improved if the relocation work is timed carefully, the trees are handled gently, and there is good aftercare and irrigation in a holding facility or at the recipient site. Goodwin (2024) and Reynolds (2024) suggest that minimizing disturbance to the root ball and adequate care after trees have been relocated are the most important factors for successful relocation. Tree spade relocation of western Joshua tree minimizes impacts to roots and can have a success rate of greater than 90% with sufficient aftercare (City of Palmdale 2024, Goodwin 2024, Reynolds 2024). Bare root relocation of western Joshua tree causes more damage to roots and is reported to have a success rate of approximately 50-90% even with sufficient aftercare, based on preliminary findings of a monitoring period of 1-3 years (Goodwin 2024, Reynolds 2024). Beyond the initial 3-year monitoring period, however, success rates can decline (Graver 2024). This document describes additional methods that can be used to aid long-term survival and improve chances of reproduction events. However, there is no foolproof method that guarantees relocation success, and some mortality is always expected to result. Therefore, relocation is considered a method to minimize impacts to western Joshua tree populations, rather than a substitution for mitigation through the payment of fees.

The size and growth pattern of a western Joshua tree may also present additional challenges. Small trees, especially those salvaged through the bare root method, experience higher rates of mortality even with sufficient aftercare (Goodwin 2024). And, though it may be possible to relocate western Joshua trees over 7 meters in height, tree spades may be unable to sufficiently encapsulate the root ball for trees of this size (Reynolds 2024). These trees may also be difficult to stabilize to withstand high wind speeds after being relocated. Dense, clonal reproduction can also affect relocation success. Separating smaller trees from larger, parent trees that are connected through rhizomes below ground can result in higher mortality rates for those smaller trees (Goodwin 2024, Graver 2024).

## Guidelines

### Relocation Requirement Considerations

The WJTCA requires that a permittee “avoids and minimizes impacts to, and the taking of, the western Joshua tree to the maximum extent practicable.” As such, CDFW may require relocation of one or more western Joshua trees as a WJTCA ITP minimization measure. CDFW will determine whether relocation will be required under an WJTCA ITP during the permit application review process, including evaluation of the site and proposed activities. CDFW has determined that projects involving a single, single-family residence will not be required to relocate any western Joshua trees. The presence of any of the following criteria will likely result in CDFW requiring a western Joshua tree Relocation Plan for a project other than a single-family residential project:

- If greater than 20 trees will be lethally taken;
- If greater than 10 acres of western Joshua tree habitat will be impacted;
- If the project is within predicted climate refugia for western Joshua tree; or
- The inability of the project to avoid take of western Joshua trees and/or the absence of other minimization measures.

When CDFW staff determine that an WJTCA ITP will require relocation of western Joshua trees as a minimization measure, the applicant will receive a letter requesting the development of a Relocation Plan. The letter from CDFW will also inform the applicant of the number of trees, by size class, that must be relocated for the Project. The Relocation Plan must be approved by CDFW prior to the issuance of the WJTCA ITP.

CDFW staff will calculate the number of trees required to be relocated based on the number of trees that will be lethally taken as confirmed by the approved census and use the “[WJT Salvage Requirement Calculator spreadsheet](#)” to assist in calculating salvage tree numbers.

The number of trees to be relocated will be based on the expected rate of relocation success for each method used, as well as the size class of each tree proposed for relocation, as explained below:

|                           | Bare root relocation <sup>1</sup> | Tree spade relocation <sup>2</sup> |
|---------------------------|-----------------------------------|------------------------------------|
| Size Class A (<1 m)       | 18%                               | 9%                                 |
| Size Class B (≥1m and <5) | 12%                               | 6%                                 |
| Size Class C (≥5m)        | 6%                                | 3%                                 |

Table 1. Recommended western Joshua tree Relocation Percentages

The number of trees in each size class for relocation under a WJTCA ITP will be rounded to the nearest whole number and be greater than zero, provided at least one tree in that size class will be lethally taken. Because tree spade relocation has a higher expected success rate than bare root relocation, the relocation of fewer trees is required to minimize project impacts and offset the expected mortality of salvage trees when the tree spade method is used.

Example salvage tree calculation:

- Project A is expected to cause lethal take of 200 western Joshua trees: 100 Class A trees, 70 Class B trees, and 30 Class C trees.
- If the bare root relocation method is used a total of 28 tree relocations would be required (18 Class A trees, 8 Class B trees, and 2 Class C trees).
- If the tree spade relocation method is used a total of 14 tree relocations would be required (9 Class A trees, 4 Class B trees, and 1 Class C trees).

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<sup>1</sup> When conducted in accordance with this document, the expected success rate of bare root relocation is between 50 and 90 percent (Goodwin, J. 2024. Joshua Tree National Park. Discussion with J. Goodwin, Vegetation Branch Manager. *in.*; Reynolds, D. 2024. The Landscape Center. Discussion with D. Reynolds, Project Manger/ISA Certified Arborist. *in.*).

<sup>2</sup> When conducted in accordance with this document, the expected success rate of tree spade relocation is greater than 90 percent (Goodwin, J. 2024. Joshua Tree National Park. Discussion with J. Goodwin, Vegetation Branch Manager. *in.*; Reynolds, D. 2024. The Landscape Center. Discussion with D. Reynolds, Project Manger/ISA Certified Arborist. *in.*; City of Palmdale. 2024. Report of the City of Palmdale Joshua tree preservation program.).

- If a combination of methods is used, one example of mixed methods may include:
  - Tree Spade: 5 Class A, 3 Class B, 1 Class C and,
  - Bare Root: 8 Class A, 2 Class B, 0 Class C

To expedite the processing of a WJTCA ITP and facilitate the development of a Relocation Plan, CDFW staff recommend that applicants with projects that meet the relocation criteria listed above review the Relocation Plan requirements prior to submitting their application. If relocation is likely to be a WJTCA ITP requirement for a project, the applicant may include a preliminary Relocation Plan with their application to help expedite processing.

### Adjustments to the Required Number of Salvage Trees

CDFW may, in its discretion, adjust the number of trees in a size class that must be relocated, including at the request of an applicant. Factors that may weigh in favor of an adjustment to the number of trees within a specific size class that must be relocated include but are not limited to:

- If a higher number of trees will be relocated in a different size class;
- If project impacts will occur in areas with high amounts of clonal growth; or
- If a legal/regulatory or a technical/technological limitation makes the relocation requirement impracticable as discussed in the Evaluation of Legal and Technical Limitations section, below.

The applicant may include rationale for any requested adjustments to the number of western Joshua trees they propose to relocate in their submitted Relocation Plan for consideration by CDFW. The applicant must document the rationale for any proposed modification, including demonstrating a good faith effort to meet the recommended percentages in Table 1.

CDFW recommends that applicants identify contingency trees that could be relocated to meet relocation requirements if a problem arises with the primary trees targeted for relocation in the Relocation Plan. For example, if tree spade relocation is proposed, additional trees must be identified for relocation as a contingency in case the tree spade relocation method is impractical due to rocky terrain or other issues. The number of additional trees that must be identified will vary on a project-by-project basis.

An approved Relocation Plan is an attachment to the WJTCA ITP. If the permittee later wishes to relocate or remove relocated western Joshua trees,

the permittee may need to apply for a new WJTCA ITP and should contact CDFW for more information.

## Relocation Areas

The applicant should identify one or more relocation areas in the proposed Relocation Plan they submit to CDFW for approval. The applicant should first evaluate if salvage trees can be relocated on the project site and if any project design or phasing modifications can be made to accommodate salvage trees on site.

If salvage trees cannot be relocated on the project site, the applicant must propose one or more off-site relocation areas that can accept trees designated for relocation. Applicants should prioritize off-site relocation areas that have been degraded by impacts. Relocation areas located within local preserves, parks, land trusts, and conservancies should also be considered. Relocation of salvage trees must be conducted in compliance with all applicable federal, state, and local laws.

Efforts should be made to relocate each salvage tree as close to its original location as is possible. Relocation areas that do not meet the criteria listed below may be approved by CDFW on a case-by-case basis. Criteria for selecting off-site relocation areas include:

- In a natural vegetation community that supports western Joshua trees;
- Prioritize locations within 16 kilometers of the salvage tree's original location, but no more than 50 kilometers from the salvage tree's original location; and
- Within 200 meters of the salvage tree's original elevation.

This document does not provide guidance regarding how to implement or support the assisted migration of western Joshua tree. At this time there is insufficient research published on the geographic boundaries of genetically distinct populations and/or climate adaptive traits within populations that may be suited for long distance (2.5 kilometers or greater from occupied habitat) assisted migration to expand western Joshua's tree's range or assisted gene flow to enhance a population's ability to adapt to climate change impacts. Opportunities for short distance (less than 2.5 kilometers from occupied habitat) assisted migration of western Joshua tree may be approved on a case-by-case basis. Assisted migration, assisted gene flow, and/or boundaries of genetically distinct populations may be discussed in future amendments to this document.



## Relocation Plan

Where relocation is required, a Relocation Plan must be approved by CDFW prior to the issuance of an WJTCA ITP. The Relocation Plan may combine bare root and tree spade relocation methods and must include the following information:

- The contact information and qualifications of the desert native plant specialist(s) overseeing relocation;
- The date range when trees will be relocated. If salvage trees will be temporarily stored in containers, the plan must indicate when the trees will be replanted;
- The landowner's name, location name, and address or APN for each relocation area property;
- If salvage trees will be relocated outside of the project site, a signed, written statement from the owner of each relocation area granting the applicant permission to relocate salvage trees to the relocation area property, granting access to implement any maintenance and monitoring measures, and authorizing CDFW staff to access the property to conduct compliance inspections with appropriate advance notification;
- The unique identifier, size class, planned and contingency relocation methods, current and recipient site GPS coordinates (latitude/longitude in decimal degrees), overall health, description of any pest/human damage, and photo for each tree to be relocated (see the [census instructions](#) for submitting photographs);
- If utilizing multiple receiver sites, the applicant must document the receiver site where each tree will be relocated using the unique identifier and recipient site coordinates;
- The number of contingency trees be identified for relocation including the information described for each additional contingency tree; and
- Any other pertinent information regarding relocation operations.

Each applicant may, but is not required to, use [CDFW's Relocation Plan template](#) and [spreadsheet](#), so long as the applicant's proposed Relocation Plan contains all the required information set forth above. Any questions regarding the development of the Relocation Plan should be discussed with CDFW staff prior to submittal to avoid project delays.

## Evaluation of Legal and Technical Limitations

In circumstances where the applicant requested modifications to the number of western Joshua trees to be relocated, the applicant must submit information to demonstrate that relocating the number of trees identified by CDFW is wholly “impracticable.” CDFW will evaluate the information provided and may approve adjustments based on the documentation outlined in the applicant’s proposed Relocation Plan. Whether the applicant minimized impacts to, and the taking of, western Joshua tree “to the maximum extent practicable” will be determined by CDFW on a case-by-case basis in consideration of several factors including whether one of the following limitations exists to make the relocation wholly impracticable:

1. Legal Impossibility: A statutory or regulatory limitation to relocating western Joshua trees exists such that compliance with the relocation requirement is legally impossible or would necessarily result in fundamental changes to the project that make it impossible to fulfill the project’s objectives. For example, a requirement to relocate trees may be legally impossible if compliance with the relocation requirement would clearly cause the project proponent to violate another permit issued for the project.
2. Technical or Technological Impossibility: A significant technical or technological limitation to relocating western Joshua trees exists such that compliance with the relocation requirement is impossible. For example, a requirement to relocate a mature western Joshua tree may be very difficult if the grade of the landscape precludes use of heavy equipment.

If either of the two limitations listed above is present, and changing a minimization measure (e.g., reducing the number of trees to be relocated or limiting relocation to certain size classes of trees) would remove the limitation so that compliance with the modified measure would be possible, then CDFW staff may modify the measure so that compliance is possible.

CDFW shall use all information in its possession relating to the project to determine whether there are legal/regulatory or technical/technological limitations that make the required relocation impossible. Once CDFW informs the project proponent of a relocation requirement, if the project proponent believes that one or more of the limitations above exist to make the relocation wholly impracticable, it may submit additional information with its Relocation Plan to demonstrate the existence of such a limitation. CDFW shall review any such information provided by the project proponent and either: (1) reaffirm the

relocation requirement; (2) modify the relocation requirement pursuant to the Adjustments to Requirements section, above; or (3) remove the relocation requirement pursuant to the Adjustments to Requirements section above. CDFW shall not modify or remove the relocation requirement unless the project proponent provides substantial evidence of one or more limitations that make the relocation wholly impracticable.

## Protocols

### Pre-Relocation

#### Selecting Trees for Relocation

Western Joshua trees that are in good health should be prioritized for relocation. Indications that a tree is in good health include where 60% or more of the tree's branches are living; minimal pest damage (no or few bore holes and/or less than 25% periderm [bark] stripping); recent signs of unrestricted hard growth; recent signs of flowering events, and/or strong vigor. Where a tree is greater than 7 meters in height, its size may limit its ability to be successfully relocated. Therefore, healthy salvage trees between 5-7 meters in height should be prioritized within Size Class C.

#### Siting

Trees identified for relocation should be clearly flagged or marked with a unique identifier and the recipient site should be identified before tree removal begins. Preferred and contingency methods for each relocation should also be identified (e.g., bare root relocation versus tree spade relocation) in advance. Each recipient site should be compatible with the corresponding salvage tree's relocation method (see Tree Spade Relocation under Digging/Tree Removal section below). The recipient site location should also be recorded using a Global Positioning System (GPS) unit and marked with pin flags or wood stakes that are clearly labeled with the unique identifier of the corresponding salvage tree. The applicant should identify a recipient site for each salvage tree that is: accessible for relocation and irrigation equipment, such as water trucks or trailers; provides or enhances connectivity corridors; mimics the density of the surrounding WJT population; and is located at least 4.5 meters from the nearest relocated western Joshua tree and 15 meters from a previously existing western Joshua tree. If possible, recipient site locations should be chosen at random and

be spatially balanced throughout the relocation area. Geographic Information System (GIS) tools can assist with this process.

### Timing

When feasible, western Joshua trees should be relocated at a time that maximizes their chance of survival. (Fish & G. Code, § 1927.3, subd. (a)(4)(A)(ii).) The optimal time to relocate trees occurs in the fall when heat/drought stress is low, and roots have adequate time to reestablish before the onset of hot, dry summer conditions. For bare root relocation, winter is a suboptimal but acceptable time to relocate trees but provides less time for roots to re-establish and may result in lower rates of survival. For tree spade relocation, there is a wider range of suboptimal but acceptable times to relocate trees because this method results in less root exposure and potential water loss through evapotranspiration as compared to bare root relocation. Relocating when trees are exposed to hot conditions for an extended period, should be avoided.

#### Bare Root Relocations

| Winter | Spring | Summer | Fall      |
|--------|--------|--------|-----------|
| OK     | Avoid  | Avoid  | Preferred |

#### Tree Spade Relocations

| Jan | Feb | Mar | Apr | May   | Jun   | Jul   | Aug | Sep | Oct    | Nov    | Dec    |
|-----|-----|-----|-----|-------|-------|-------|-----|-----|--------|--------|--------|
| OK  | OK  | OK  | OK  | Avoid | Avoid | Avoid | OK  | OK  | Prefer | Prefer | Prefer |

### Pre-Relocation Watering

In preparing for relocation, both the salvage trees and the recipient sites should be watered 24-48 hours in advance. An earthen berm 4-6 inches in height should be created around the trees and recipient sites to create water basins that ensure water saturates the soil around the root ball and recipient site. For bare root relocations, the perimeter of the berm should be no less than 24 inches from the base of the trunk. For tree spade relocations, the size of the berm should be slightly wider than the width of the tree spade to be used on that individual. The water basins should be filled with water to just below the top of the berm twice and allowed to fully drain between fillings. Root stimulant additives such as vitamin B1 and rooting hormone may assist in root regeneration but are not required. Root stimulant additives should be utilized according to product label recommendations.

## Orientation

Prior to relocation, using a compass set to the correct declination, mark the north side of the tree identified for relocation with a water-based tree marking paint or other CDFW-approved means in a place that will not be impacted or obscured during relocation operations (e.g., a small paint mark on the trunk 12 inches above ground level or ribbon tape tied to one of the branches on the north side of the tree). When setting a salvage tree in a recipient site, best efforts should be made to place the tree in its original orientation; however, this may not be possible based on the terrain of the recipient site.

## Other Pre-Relocation Precautions

- Relocation operations should adhere to the American National Standards Institute Z133 Safety Requirements for Arboricultural Operations.
- Permittees should obtain all information necessary to avoid existing underground infrastructure at salvage and recipient sites prior to relocation (see [Underground Service Alert of Southern California \(DigAlert\)](#)).
- To prevent the spread of invasive species and pathogens, digging equipment should be clean and free from dirt and debris and sanitized with a 10% bleach solution prior to arriving at the site where trees will be salvaged.
- Depending on the method used, tree limbs may need to be trimmed to facilitate relocation. Limbs should only be trimmed as necessary to facilitate relocation.

## Relocation

### Digging/Tree Removal

If trees are in close proximity to each other (less than 18 inches apart at the bases of their trunks), all efforts should be attempted to relocate the trees together to avoid separation of trees that are connected through rhizomes below ground.

Bare root removal by hand – Relocations using only hand tools should only be done for trees that are less than 1 meter in height. The root ball and surrounding soil should be salvaged in a way that keeps the root ball as intact as possible. This can be accomplished by excavating a circular trench 10-12 inches deep, 1-2 feet from the base of the trunk. Once the trench is complete, hand tools should be used to undercut the root ball and sever the roots below. Only apply



as much lateral pressure to the tree as necessary to expose roots for severing with hand tools. The cut surfaces on roots should be kept small to minimize root dieback and exposure to soil-borne pathogens.

Bare root removal by (non-tree spade) heavy equipment/excavator – As with bare root removal by hand, the root ball and surrounding soil should be salvaged in a way that keeps the root ball as intact as possible. There are different ways to accomplish this using an excavator, depending on the tree's size, soil conditions, and other factors. For trees that are less than 1 meter in height, an excavator with a bucket attachment at least 24 inches in width can be used to extract the tree and root ball in one scooping motion. The equipment operator should minimize incidental damage to the aboveground portion of the tree to the greatest extent possible. Root balls should be handled with care when they are unloaded from the bucket. For trees that are 1 meter or greater in height, a trench 18-24 inches deep should be excavated 2 feet from the base of the trunk. If the soil around the root ball stays intact and does not show signs of fracturing, the tree should be firmly rigged to the rounded exterior of the bucket using nylon straps at least 4 inches in width (Figure 1). Additional cloth padding may be placed around the straps to prevent damage to the periderm. Straps should be rigged at multiple points along the main trunk of the tree to prevent excessive swinging once freed from the soil. Once firmly rigged, the root ball should be undercut using hand tools as safely as possible until all or most of the roots are severed. Snapping roots should be minimized, as much as possible.

If the soil around the root ball does not hold together and shows signs of fracturing and instability when excavating the trench, as is common in sandy soils, the excavator should be used to undercut the root ball as much as possible without causing the tree to fall freely to the ground.

The tree should then be rigged to the bucket attachment using the methods described above and gentle but increasing lateral pressure should be applied to the tree to dislodge the root ball and lay the tree down. Once the tree is resting on the ground, the straps may need to be adjusted in order for the tree to be picked up by the excavator.

Trees removed from the ground using the bare root method should be replanted or containerized within 24 hours of removal.



*Figure 1 – Bare Root Removal: Removing soil around the root ball of a salvage tree using hand tools (left). Salvage tree being removed from the ground by an excavator (right). (Photo credit: National Park Service)*

Tree spade relocation – Tree spades come in different sizes based on the width of the soil surface that they can encapsulate (Figure 2). Tree spades can be used to relocate trees of most sizes. However, they are not recommended for trees over 7 meters in height due to stabilization issues during high-speed wind events after relocation.

The following steps must be carried out sequentially, in a timely manner, and thoughtfully. Each western Joshua tree and corresponding recipient site should be evaluated for tree spade acceptability prior to digging. The desert native plant specialist should evaluate soil conditions to assess whether large rocks or boulders may prevent tree spade blades from fully encapsulating the root ball. This may be apparent by scanning the surface of the surrounding area or reviewing existing soil maps (see “Shallow Excavation Ratings” on NRCS Web Soil Survey: <https://websoilsurvey.nrcs.usda.gov/app>). Tree limbs may be trimmed only where necessary to allow the tree spade blades to fully close around the tree. The tree spade size should be selected to ensure the blades do not come within 18 inches of the base of the trunk at ground level. Recipient sites should be dug immediately before, or no more than 4 hours prior to, tree extraction to prevent the soil from drying out and collapsing. Excavated recipient site dirt should be used to backfill the tree removal site where available. Open pits should be flagged with stakes and high-visibility ribbon tape and temporary fencing should be installed around any unattended open pits to prevent people or animals from falling in.



*Figure 2. A salvage tree being removed from the ground using a tree spade  
(Photo credit: National Park Service).*

## Transporting Trees

If salvage trees are not going to be transported to recipient sites by hand or by the equipment used to extract the tree (e.g., by truck or trailer), precautions must be taken to avoid damage to the tree and root ball. Root balls should be loosely wrapped in burlap and kept moist during transport. Salvage trees should be supported at all times and not dropped or thrown. Salvage trees should be securely transported upright or at a slight angle. Salvage trees may touch other salvage trees during transport, but they should not be stacked or otherwise fully supported by other salvage trees. Salvage trees should be positioned in transport vehicles in a way that minimizes branch entanglement.

## Planting Methods

Bare root relocations - The width of each recipient site hole should be approximately 12 inches greater than the width of the root ball. Root balls should fit snugly within their recipient holes to avoid stabilization issues. The depth of recipient sites holes should be 2-4 inches less than the height of the root ball to account for settling. If recipient site holes are dug too deep, they should be backfilled and compacted by foot or using hand tools. Salvage trees should be placed as close to their original orientation as the terrain will allow. Salvage trees

should be supported when lowered into holes. Holes should be simultaneously backfilled with soil and water to eliminate air pockets and voids. Soil should be lightly compacted by foot or using hand tools.

Tree spade relocations - The salvage trees should be placed as close to their original orientation as the terrain will allow. If needed, soil should be backfilled and lightly compacted by foot or using hand tools to meet the grade of the surrounding soil surface.

## Storage

If salvage trees need to be stored for later replanting, in-ground storage is preferred over containerizing. In-ground storage procedures should follow the pre-relocation water berm, planting, post-relocation water berm, and stabilization methods described herein. Salvage trees stored in-ground should be flagged for avoidance and/or fenced off.

If in-ground storage is not possible, each salvage tree should be placed in a container that is at least twice the size of the unrestricted root ball and includes drainage holes. The containers should be sanitized with a 10% bleach solution. The container should be filled using soil from the removal site if the salvage tree is being stored for less than 6 months or with a soil mix ratio of 100 parts organic potting soil to 160 parts course perlite to 200 parts washed concrete sand to 1 part "13-13-13" fertilizer (Goodwin 2024) if the salvage tree is being stored for longer than 6 months. The bottom one third of the container should be filled with soil mixture before placing the root ball into the container. Once the root ball is placed into the container, the remaining volume of the container should be filled with soil and water simultaneously to eliminate air pockets and voids. Salvage trees should not be stored in containers for longer than 2 years unless approved by CDFW. Containerized salvage trees should be stored either upright or at a slight angle to improve drainage and prevent root rot. If weather forecasts predict wind gusts over 60 mph, containerized trees should be closely grouped and tied together 24 hours in advance for added stability. If containerized salvage trees are pushed over, they should be promptly righted and stabilized using the methods described below for the duration of the storage period. Containerized salvage trees should be maintained and monitored following the methods described below. If trees show signs of drought stress, watering frequency may need to be increased. Containerized soil should always be allowed to thoroughly dry out before rewatering. Containerizing a salvage tree that has been removed from the ground using the tree spade method in a container would eliminate the benefits from this relocation method;

therefore, salvage trees removed from the ground using the tree spade method should always be stored in the ground.

## Post-Relocation

### Water Basins

An earthen berm at least 4 inches in height should be created around each salvage tree following relocation. The top of the berm should be level. For bare root relocations, the perimeter of the berm should be no less than 24 inches from the base of the trunk. For tree spade relocations, the perimeter of the berm should be the width of the tree spade.

### Stabilization

Stabilization material should be installed for salvage trees that are greater than 3 meters in height and for trees that are less than 3 meters in height with a tree height to canopy width ratio that exceeds 2:1. For example, a 2-meter-tall tree with a canopy width greater than 1 meter should have stabilization material installed. Non-abrasive guying materials, such as Arbor Ties, should be attached to three equidistant lateral ground-point anchors outside of the water basin. Guys should be taut but allow for some movement so they do not cause friction in light to moderate wind conditions.

### Identification

Each salvage tree should be clearly flagged with tape ribbon or a metal tree tag, and labeled with a unique identifier (e.g., #1, #2, #3) and the relocation date (or the date when first removed from the ground for containerized salvage trees) in the following format: MM/DD/YYYY. Each tree tag should be loosely secured to the main trunk of the tree, rather than nailed directly into hard growth, and should be visible from the south. Each western Joshua tree stem or trunk arising from the ground shall be considered an individual tree requiring flagging, regardless of its proximity to any other western Joshua tree stem or trunk.

### Recordation

A GPS unit should be used to record the location of each salvage tree's recipient site. The relocation method (bare root – hand, bare root – excavator, or tree spade) should also be recorded, along with a color photo of each tree



taken from the south of the tree facing north. The picture should include the entire tree.

## Maintenance and Monitoring

Where relocation is required under a WJTCA ITP, it is the permittee's responsibility to ensure the maintenance and monitoring measures set forth below are implemented and as required in the permittee's WJTCA ITP.

### Site Visits

Site visits should be conducted by a technician with relevant experience in assessing the signs of western Joshua tree health to determine maintenance needs for relocated trees according to the following schedule:

#### Year 1

- Months 0-3, once every two weeks.
- Months 4-12, once per month.

#### Year 2

- Months 13-24, every other month.

#### Year 3

- Months 25-36, every other month only for trees showing signs of declining health. At the end of the 3-year maintenance period, all trees should receive a final site visit and be assessed according to the Completion Report section below.

During site visits, technicians should assess and record maintenance needs for each salvage tree. They should also have a site map showing the locations of all salvage trees, a GPS device to confirm salvage tree locations, and notes and photos from previous visits, and they should be prepared to address maintenance needs during site visit or shortly thereafter.

## Watering

During the months of May to September, salvage trees should only be watered during site visits if the total rainfall (or snowfall equivalent) for the region within which the recipient site is located is less than 0.4 inches within the previous 7 days. During the months of October to April, salvage trees should only be watered during site visits if the total rainfall (or snowfall equivalent) for the region

within which the recipient site is located is less than 0.3 inches within the previous 7 days. Regional precipitation models may be used in determining rainfall amounts; however, rain gauges within, or adjacent to, relocation areas provide the best indicator of precipitation totals. Water basins should be filled to the top of the berm, but not allowed to overtop the berm. A technician with relevant experience in assessing the signs of western Joshua tree health is not needed to water salvaged trees.

## Tree Health

Tree health should be assessed by a technician and recorded for each salvage tree during site visits. Tree health should consider signs of new leaf growth, branch loss, signs of flowering/fruitletting, signs of pest/human-caused damage, leaf discoloration, restricted hard growth, overall vigor, and other indicators worth noting. If salvage trees are showing signs of increasing health after two years of maintenance, they do not need to be visited during the third year (see reporting requirements below), except for the final site visit.

## Invasive Plant Removal

Invasive plants should be controlled and removed within the water basin. Removal should occur before invasive plant seeds reach maturity. Invasive plants should be removed through mechanical methods and hand pulling or with hand tools, rather than by chemical means, and appropriately disposed of. In removing invasive plants, care should be taken to not damage salvage tree roots. A list of common invasive plant species can be found on the California Invasive Plant Council Invasive Plant Inventory (Cal IPC Inventory) website at: <https://www.cal-ipc.org/plants/inventory/>. Native plants should be retained where possible.

## Maintenance of Berms, Stabilization Supports, and Identification Markers

During site visits, berms should be checked for height and any breaks that would allow water to escape from the water basin. Stabilization supports should be checked for damage and tightness. If relocated trees are showing signs of leaning, stabilization supports should be added or adjusted. Identification markers should also be checked for intactness, legibility, and maintenance needs.

## Completion Activities

During the final site visit at the end of the 3-year maintenance period, berms, stabilization supports, and identification markers must be removed from the relocation area.

## Reporting

Where relocation is required under a WJTCA ITP, it is the permittee's responsibility to ensure the reporting measures set forth below are implemented. Where relocation is voluntary, CDFW requests that the permittee provides the same reporting information to CDFW to better inform updates to these guidelines and relocation protocols.

### Post-Relocation Reporting

When a WJTCA ITP requires relocation of western Joshua trees, the permittee must submit a post-relocation report to CDFW no more than 30 days after relocations are completed. The post-relocation report should include the following:

- The date range when relocation operations occurred; and
- For each salvage tree:
  - The unique identifier and recipient site coordinates;
  - The final recipient site, including GPS coordinates (latitude/longitude in decimal degrees);
  - The relocation method used;
  - The height and diameter of the post-relocation water basin constructed;
  - Any stabilization supports installed;
  - Any major damage, including any necessary limb trimming, that occurred during relocation;
  - Any deviation from the tree's original orientation;
  - Any root stimulant additives used in pre- or post-relocation irrigations; and
  - A photo of the tree facing north, with the unique identifier in each file name.

## Maintenance Reports

When a WJTCA ITP requires relocation of western Joshua trees, the permittee must submit annual reports detailing the 1-year and 2-year maintenance periods, as appropriate, to CDFW. Maintenance reports should include the following information:

- The date(s) when site visit(s) occurred;
- The contact information and relevant experience of the technician(s) performing tree assessments; and
- Information for each salvage tree regarding the following:
  - The unique identifier and recipient site coordinates;
  - Whether the tree is alive or dead;
  - Dates of supplemental waterings;
  - Identity and estimated number of invasive plants observed/controlled and the methods used;
  - Any signs of pest/human damage;
  - Any signs of declining tree health;
  - Any maintenance conducted to repair, replace, add, or adjust berm, stabilization supports, and/or identification markers;
  - A photo of the tree facing north, with the unique identifier in each file name; and
  - At the end of the 2-year period, the reasons for discontinuing maintenance on trees showing stable or increasing health, such as new leaf growth, flowering/fruitletting, good leaf color, no signs of pest/human damage, and/or unrestricted hard growth.

## Completion Report

A completion report must be submitted to CDFW no more than 30 days after the end of the 3-year maintenance period. The completion report must contain the following:

- The date when the final site visit occurred;
- The date when berm/stabilization materials/identification markers were removed;
- The contact information and qualifications of the technician(s) performing the final assessment; and
- Information for each salvage tree regarding the following:
  - Whether the tree is alive or dead;
  - Any damage that occurred during or after relocation;

- Any signs of declining health;
- Any signs of pest damage; and
- A photo of the tree facing north, after berm, stabilization materials, and identification markers are removed, with the tree's unique identifier in each file name; and
- Any recommendations that may help to improve tree relocation methods.

## Literature

Bainbridge, D. 2007. A guide for desert and dryland restoration: New hope for arid lands. Island Press, Washington D.C. 20009, USA.

Balogh, M. A. 2019. Mojave Desert ecosystem recovery: Potency of biotic and abiotic restoration methods in low elevation plant communities. University of Nevada, Las Vegas, Thesis, Las Vegas, Nevada, USA.

City of Palmdale. 2024. Report of the City of Palmdale Joshua tree preservation program.

Wagner, M. L. 2018. Factors influencing revegetation efforts in the Mojave Desert: Field studies and meta-analysis of the Morongo Basin and Joshua Tree National Forest. California State Polytechnic University, Thesis, Pomona, California, USA.

## Personal Communications

Goodwin, J. 2024. Joshua Tree National Park. Discussion with J. Goodwin, Vegetation Branch Manager. [22 Mar 2024].

Graver, N. 2024. Joshua Tree National Park. Desert Native Plant Specialist Review of "Western Joshua Tree Relocation Protocol". [10 June 2024].

Reynolds, D. 2024. The Landscape Center. Discussion with D. Reynolds, Project Manager/ISA Certified Arborist. [1 May 2024].



# Appendix F.

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## Conservation Lands Prioritization Assessment



# CONSERVATION LANDS PRIORITIZATION ASSESSMENT

## Background

The purpose of this appendix to the Western Joshua Tree Conservation Plan is to provide biological guidance for land acquisitions or other mitigation opportunities supported by the Western Joshua Tree Conservation Fund (Conservation Fund) or any successor fund. The guidance frames minimum habitat standards, identifies standards for surveys/censuses/habitat evaluations, and proposes an evaluation framework for potential acquisitions or mitigation opportunities.

Conservation and Mitigation opportunities with the highest conservation value should:

- have large areas occupied by western Joshua tree,
- have a high density of reproductive adult individuals,
- have high recruitment (indicating presence of small mammals, nurse plants, and pollinating moths),
- be within predicted climate refugia,
- have low risk from current and adjacent land use, and
- have good overall tree health.

To maximize the conservation value of each acquisition or mitigation opportunity, a point scoring system is provided to help identify properties with the highest conservation value. Criteria below have been weighted based on expected value for Joshua tree conservation over the long term. Recommendations for surveys/censuses/habitat evaluations submitted with proposals are also provided.

## Conservation Criteria

### Occupied Area

Properties with larger areas occupied by western Joshua may have higher conservation value. For example, a property with 50 hectares (123.6 acres) occupied by western Joshua tree would rank lower than property with 300 hectares (741.3 acres) occupied by western Joshua tree. A standard assessment area of **100 meters (328.1 feet) from adult trees** is recommended to calculate occupied area at all properties. Non-suitable habitat, such as hardscapes, should not be included. CDFW will need to see which properties are available before applying areas to the large/medium/small criteria below.



- Large area occupied by western Joshua tree (30 Points)
- Medium area occupied by western Joshua tree (18 Points)
- Small area occupied by western Joshua tree (6 Points)

## Density of Individual Adult (Reproductive) Trees

Properties with a high density of individual reproductive adult trees should be prioritized. Density is area dependent, and therefore all density calculations should be based on the “occupied area” value determined above (density = number of individual reproductive adult trees/occupied area). For this calculation, trees with multiple clonal stems should be considered as one individual tree. Values are adapted from the condition categories in the 2023 US Fish and Wildlife species status assessment report for Joshua trees, and these density categories can be adjusted for this assessment, if needed.

- High density: greater than 50 trees/hectare (20 adult trees/acre) (5 Points)
- Moderate density: between 25 to 50 trees/hectare (10 and 20 adult trees/acre) (3 Points)
- Low density: fewer than 25 trees/hectare (10 adult trees/acre) (1 Point)

## Recruitment

The number of juvenile trees in a population indicates the level of recent recruitment in that population. Tree age is correlated with tree height; therefore, tree height values can be used to assess the amount of recent recruitment. Values are adapted from the condition categories in the 2023 US Fish and Wildlife species status assessment report for Joshua trees, and these recruitment categories can be adjusted, as needed.

- High Recruitment: greater than 15 percent of the number of trees attributable to juveniles (trees less than 1 meter [3.3 feet]) (5 Points)
- Moderate Recruitment: 8–15 percent of the number of trees attributable to juveniles (trees less than 1 meter [3.3 feet]) (3 Points)
- Low Recruitment: less than 8 percent of the number of trees attributable to juveniles (trees less than 1 meter [3.3 feet]) (1 Point)

## Within Predicted Climate Refugia

Predicted models for climate refugia for western Joshua tree are provided by Shryock et al. (2025). Higher elevations and more northerly locations are generally predicted to be more



likely climate refugia. Marginal cases may be difficult to assess, but this is still an important assessment. Is the property within the predicted climate refugia category?

- Yes, within high emissions modeling scenario (SSP 5-8.5) of the predicted climate refugia category (40 Points)
- Yes, within moderate emissions modeling scenario (SSP 3-7.0) of the predicted climate refugia (24 Points)
- Yes, within low emission modeling scenario (SSP 2-4.5) of the predicted climate refugia (12 Points)
- No, but within the buffered climate refugia category, modeled as climate refugia, and currently unoccupied by western Joshua tree (6 Points)
- No, but within the buffered climate refugia category, not modeled as climate refugia, and currently occupied by western Joshua tree (6 Points)
- No, but within the buffered climate refugia category, not modeled as climate refugia, and currently unoccupied by western Joshua tree (3 Points)
- No, not within the predicted climate refugia category or buffered climate refugia category (0 Points)

## Land Use

Conservation value is highly dependent on the habitat condition, risks of impact from land use on the property being evaluated, and on adjacent and nearby properties. Low quality habitat is less likely to support the species that western Joshua trees depend on, including pollinating moths and rodents. High risk from wildland fire ignition, land ownership and use, plant community composition, and proximity to roads and trails all affect the current and future biological value of a property, whether they are present on the property being evaluated, or on adjacent and nearby properties.

- Low risk from current and adjacent land use (e.g., adjacent to preserved wilderness, far from high-traffic roads and trails, low invasive species cover) (15 Points)
- Moderate risk from current and adjacent land use (e.g., adjacent to high-traffic roads and trails, moderate invasive species cover) (9 Points)
- High risk from current and adjacent land use (e.g., adjacent to development or unprotected habitat, off-highway-vehicle use, high invasive species cover) (3 Points)



## Disease/Pest/Mortality Health Assessment

Tree health is an indicator of whether the population is currently stressed. Health assessments of individual trees would contribute to assessing the health of the entire population on the property.

- Population in generally good health (e.g., few signs of damage, pests, or health problems, trees generally upright, limbs generally upright, few exposed roots at the bases of trees, nurse plants are present for recruitment) (5 Points)
- Population in average health (e.g., some signs of damage but most trees likely to persist or rebound) (3 Points)
- Population in poor health (e.g., broken/hanging limbs, yellowing or brown leaves, visible signs of damage [fire damage, bark stripping, boring (weevils, beetles)], excessive leaning of trees, fallen trees, few nurse plants for recruitment) (1 Point)

## Proposal Survey Standards

- To calculate occupied area, a complete tree census with a Global Positioning System (GPS) point for each tree within the property boundary would be required. For large properties, results of remote sensing techniques via satellite imagery or other technology are acceptable. A standard assessment area of **100 meters from adult trees (328.1 feet)** is recommended to calculate occupied area at all properties. The resulting buffered area should then be clipped to within the property boundary.
- The tree census should include height for each tree to the nearest tenth of a meter. Height for clonal trees should be measured based on height of the tallest tree in the clonal group.
- The tree census should indicate whether each tree has clonal growth or not, and if so, the number of stems.
- The tree census should indicate whether or not each tree is a reproductive adult (i.e., there are branches or other evidence of recent flowering).
- The tree census should assess the health of each living tree as either good, average, or poor.





## Conservation Lands Prioritization Assessment Scoring Sheet

Name of Assessment Scorer:

Date of Assessment:

Name and Location of Property:

| Criteria                                         | Point Score | Notes |
|--------------------------------------------------|-------------|-------|
| Occupied Area                                    |             |       |
| Density of Individual Adult (Reproductive) Trees |             |       |
| Recruitment                                      |             |       |
| Within Predicted Climate Refugia Category        |             |       |
| Land use                                         |             |       |
| Disease/Pest/Mortality Health Assessment         |             |       |



## References

Shryock, D. F., T. C. Esque, G. A. Berry, and L. A. DeFalco. 2025. Models of future suitable habitat for Joshua trees (*Yucca brevifolia*, *Yucca jaegeriana*) in the Mojave and Sonoran Deserts based on high resolution distribution data: U.S. Geological Survey data release. <https://doi.org/10.5066/P1I6UGOB>.



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# Appendix G.

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Foundational Commitments by  
CDFW for Developing Western  
Joshua Tree Conservation Plan  
Co-Management Principles with  
California Native American Tribes



# FOUNDATIONAL COMMITMENTS BY CDFW FOR DEVELOPING WESTERN JOSHUA TREE CONSERVATION PLAN CO-MANAGEMENT PRINCIPLES BETWEEN CALIFORNIA NATIVE AMERICAN TRIBES AND CALIFORNIA AGENCIES

Foundational commitments by California agencies are important for underpinning and guiding development of co-management principles with California Native American tribes for implementing joint activities to conserve western Joshua tree. The following CDFW commitments were adapted from the Advisory Council on Historic Preservation (ACHP) 2004 Policy Statement on Indigenous Knowledge and Historic Preservation, and represent the collaborative, co-equal character of the activities state agencies will carry out in developing and implementing the co-management principles of the Western Joshua Tree Conservation Plan.

1. **Respect and Relationship Building.** Tribal knowledge, including Traditional Ecological Knowledge, will be treated with respect in all circumstances. This knowledge is frequently revered by the individual, family, clan, or community associated with it, and it may have an active role in ongoing cultural practices and ways of understanding. Disrespect, misuse, or abuse could violate cultural and ethical protocols, or may impact a Tribe in other ways, including socially, politically, or economically. Developing and maintaining a positive and mutually beneficial relationship with Tribes will help facilitate an increased understanding of what constitutes respect and how those actions lead to the proper integration of Traditional Ecological Knowledge into western Joshua tree conservation.
2. **Valid and Self-Supporting Knowledge.** The Traditional Ecological Knowledge held by a Tribe is a valid, sound, and self-supporting source of information and is an aspect of the best available science. It does not require verification by any other knowledge system to inform state decision making in western Joshua tree conservation. Designated representatives of Tribes are, and will be recognized as, subject matter experts regarding the application of their Traditional Ecological Knowledge.
3. **Cultural and Religious Significance of Traditional Ecological Knowledge.** Conservation actions affect resources and properties that may be of religious and cultural significance to Tribes. The development and implementation of conservation management actions will be guided and informed by Traditional Ecological Knowledge, where Tribes consent to share that knowledge with state agencies. For purposes of state environmental laws relevant to western Joshua tree conservation, the term "Traditional Ecological Knowledge" includes, but is not limited to, the experiences, insights, and knowledge held by Tribes that can assist state agencies in identifying, evaluating, assessing, and resolving adverse effects to resources and properties that may be of religious and cultural significance to the Tribes.





While state law directs state agencies to make the final decisions in environmental review, the WJTCA also directs agencies to consult with Tribes in carrying out conservation activities. Deference will be provided to the expertise of designated tribal representatives where Traditional Ecological Knowledge is provided to inform decision making. State agencies recognize and defer to tribal interpretation of the resource's or property's religious or cultural significance and integrity. Efforts taken to avoid or minimize adverse effects to western Joshua tree on tribal land should reflect the Traditional Ecological Knowledge and other input provided by the Tribe, recognizing they are uniquely suited to inform those decisions and can provide information to help define what may be or may not be appropriate. Efforts to reach consensus on management actions should prioritize and recognize the preferences of Tribes on tribal land including consideration of religious and cultural significance important to them.

4. **Fair Compensation.** If a state agency requests a Tribe to provide Traditional Ecological Knowledge via research, survey, monitoring, or other efforts, the Tribe should be fairly reimbursed or compensated. Traditional Ecological Knowledge is a distinct form of expertise that cannot be supplanted through other forms of knowing. Designated representatives of Tribes are the appropriate subject matter experts with the experience and qualifications to inform state agency decision making in the conservation of western Joshua tree on tribal lands. In many cases, identifying, vetting, and deciding whether and how to share Traditional Ecological Knowledge requires research, work, or additional action on the part of the Tribe.
5. **Records Reflect Tribal Involvement.** The importance of Tribal Ecological Knowledge will be documented in conservation project records. Any determination, finding, or agreement that relates to the western Joshua tree conservation on tribal lands or other properties that may be of religious and cultural significance to a Tribe will include sufficient documentation to enable any reviewing party to identify when and how consultation efforts facilitated opportunities for Traditional Ecological Knowledge to inform decision making. These records should reflect if Traditional Ecological Knowledge was incorporated into final decisions, or include detailed justifications as to why not, being cognizant to protect or withhold confidential and sensitive information, as deemed by Tribes.
6. **Consultation Timelines.** Timelines will reflect the complexity and nature of the undertaking and recognize and attempt to accommodate decision-making processes of associated Tribes. When seeking information from a Tribe regarding conservation management actions on tribal land or properties that may be of religious and cultural significance to them, the agency will initiate consultation early enough in the planning process for effective consultation. State agencies should provide as much advanced notice of consultation meetings as possible and should extend review timelines accordingly, where needed to result in effective consultation and sharing of Traditional Ecological Knowledge.



7. **Professional Qualifications of Tribal Representatives.** The State recognizes that representatives of Tribes have professional qualifications. As sovereign Nations, Tribes retain the right to determine who has the expertise and qualifications to represent them and their Traditional Ecological Knowledge in the implementation of the Conservation Plan. Consistent with state government procedures, state agencies will identify designated representatives of Tribes as subject matter experts who meet the professional standards needed to inform findings and determinations relevant to conservation management actions on tribal Lands or properties that may be of religious or cultural importance to them.
8. **Managing and Protecting Sensitive Tribal Information.** The State will prevent or limit to the maximum extent feasible any inappropriate disclosure of confidential or sensitive information through all available mechanisms. Traditional Ecological Knowledge frequently includes information that is confidential, sensitive, sacred, and/or internal to a Tribe. To the maximum extent feasible, state agencies will clearly inform Tribes of any limitations on the agencies' ability to keep Traditional Ecological Knowledge confidential before discussing Traditional Ecological Knowledge. When seeking or integrating Traditional Ecological Knowledge, state agencies will consider not only how it would influence decision making, but also how it would account for any cultural, governmental, legal, or ethical protocols the Tribe may have that dictate its application and use. If Traditional Ecological Knowledge is provided, maximum effort will be taken to live up to the state government's trust commitments to protect confidential or sensitive tribal information.



# Appendix H.

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## Enhancement and Restoration Prioritization Assessment



# ENHANCEMENT AND RESTORATION PROJECT PRIORITIZATION ASSESSMENT

## Background

The purpose of this appendix to the Western Joshua Tree Conservation Plan is to provide guidance on how enhancement and restoration projects supported by the Western Joshua Tree Conservation Fund (Conservation Fund) will be evaluated and prioritized. Projects with an overall goal of reducing threats or restoring western Joshua tree habitat would be considered for funding. Important components of western Joshua tree habitat include, but are not limited to, reproducing adult individuals, non-reproducing juvenile individuals, seeds/seed bank, native nurse plants, suitable soils, pollinating moths, seed dispersers, and western Joshua trees with advantageous genetic traits/adaptations. Threats to western Joshua tree habitat that may be reduced by enhancement and restoration projects include but are not limited to invasive plants, wildland fire, erosion, vehicle impacts, grazing impacts (e.g., herbivory, trampling, soil compaction), and other pests or diseases (e.g., weevils, beetles).

## Minimum Qualifications

- Project will be conducted by the owner or the property or their agent, unless otherwise approved by CDFW.
- Project area has been degraded by impacts that may be reduced by the project.
- The project proposal is clearly written and includes objectives, methods, and goals.
- The project proponent has committed to maintain and monitor the project for 2 years and to report the results to CDFW.
- The project includes consultation with a desert restoration expert with 5 years of desert restoration experience. The resume of desert restoration experts will be submitted to CDFW for approval.

## Evaluation Criteria

Projects will be evaluated based on the provided point scoring system.

- **Enhancement/ Restoration Design (1–15 Points):** The design of a project will be evaluated based on its completeness and clarity of objectives, methods, goals, and a plan to maintain and monitor the site. Proposals should be reviewed and approved by a specialist with desert restoration experience.



- Excellent (15 Points) – All aspects of enhancement/restoration design are clear and well-defined. Goals and objectives are specific, measurable, and realistic. The proposal includes detailed methods that outline all aspects of the project from start to finish and includes timelines for implementation. Project is “shovel ready” meaning that all necessary agreements and/or compliance (if applicable) are complete.
- Fair (9 Points) – All or most aspects of the enhancement/ restoration design are included but some are unclear. Some additional steps are required before the project can be implemented. Goals are qualitative.
- Poor (3 Points) – Elements of the enhancement/ restoration design are included but some are missing important details. There is no clear path or timeline towards implementation.
- **Urgency and Severity of Threat (1–15 Points):** The project should alleviate one or more threats to western Joshua tree and its habitat such as low population size, lack of important resources, invasive plants, wildland fire, erosion, vehicle impacts, grazing impacts, or other pests or diseases. Projects that alleviate more urgent and severe threats will be ranked higher than projects that alleviate less urgent and severe threats.
  - Severe and urgent threats alleviated (15 Points) – Threat requires immediate action. Effects are substantial and irreversible with permanent consequences such as extirpation of a population or local genotype.
  - Moderate and semi-urgent threats alleviated (9 Points) – Threats are increasing in size and magnitude and are likely to have severe consequences in the next few years, such as significant reductions in population viability. Threats are reversible but only with extensive external input.
  - Minimal and non-urgent threats alleviated (3 Points) – Threats have been ongoing and are not likely to cause any significant impacts to the resource in the immediate future. Consequences of the threat may be a minor or seasonal reduction in population viability. Effects are easily reversible with little to no lasting effects.
- **Problem Resolution (1–15 Points):** Projects that alleviate threats over longer time periods will be ranked higher than projects that alleviate threats over shorter time periods.
  - Excellent (15 Points) – Project will implement specific actions that will result in resolution of the issue(s) or threat(s) for long periods of time (decades or longer). There is a high likelihood that project goals will be achieved. Actions are performed on a one-time basis (although the duration of implementation may be long, such as a five-year planting project with five additional years of monitoring and supplemental watering). The project benefits are expected to be self-sustaining for a decade or more after completion of the project.





- Fair (9 Points) – Project contributes to the resolution of the problem(s) but will not fully resolve the issue(s). Some cyclic ongoing maintenance will be required to achieve project goals. The project benefits are expected to be self-sustaining for one to several years after completion of the project.
- Poor (3 Points) – Project will contribute basic information about the problem(s) but does not directly lead to resolution of the issue(s). The project benefits are not expected to be sustainable after the completion of the project.
- **Maintenance and Monitoring Plan (1–15 Points):** Regular maintenance and monitoring of the site and local conditions are needed to ensure ecological processes are heading in the intended direction, and that adjustments are made accordingly. The frequency of maintenance visits will vary based on project activities and timeframes. For example, nursery plants may need regular watering in the years after initial installation but require less frequent watering in later years after they become established. The site characteristics that are monitored, and their frequencies, will also vary based on the project activities; however, more points will be given to projects that consider a full range of factors that contribute to the success of the enhancement or restoration project. For example, monitoring invasive grasses may help detect when fuel reduction treatments are necessary. Annual reporting to CDFW and National Fish and Wildlife Foundation (NFWF) will be required for a minimum of 2 years, and projects with longer commitments will receive more points.
  - (15 Points) – Project includes a detailed schedule for regular maintenance and monitoring for 10+ years. The rationale for the frequency of maintenance visits is clearly explained and cost effective. The monitoring plan considers a wide range of ecological aspects that may affect the success of the project. Quantitative trigger points for adjustments to management actions are incorporated into the plan.
  - (9 Points) – Project includes a detailed schedule for regular maintenance and monitoring for 5 years. The rationale for the frequency of maintenance visits is explained but some aspects are unclear or not cost effective. The monitoring plan considers some important ecological aspects that may affect the success of the project.
  - (3 Points) – Project includes minimal maintenance and monitoring for 2 years. The rationale for the frequency of maintenance visits is unclear and not cost effective. Monitoring of one ecological aspect will occur annually.
- **Collaborative Engagement (1–10 Points):** Projects that have been endorsed or supported by a diverse group of collaborators and that will be implemented by many partners will rank higher than projects that were developed by and will be implemented by few individuals.



- High (10 Points) – Project demonstrates co-management with multiple Tribes, and collaboration with multiple local/regional partners including, but not limited to, other governmental agencies, diverse interested organizations, educational groups, and local communities.
- Moderate (6 Points) – Project demonstrates co-management with a specified Tribe and/or collaboration with a local/regional partner.
- Low (2 Points) – Project has potential for co-management with a Tribe and/or collaboration with other agencies, but entities are not specifically identified.
- **Cost Effectiveness (1–10 Points):** Projects that will supplement funds from the Conservation Fund with other funds and resources to implement the proposed project will rank higher than projects that rely heavily or entirely on the Conservation Fund.
  - High (10 Points) – Conservation Funds represent less than 25 percent of the total project cost.
  - Moderate (6 Points) – Conservation Funds represent 25–75 percent of the total project cost.
  - Low (2 Points) – Conservation Funds represent greater than 75 percent of the total project cost.
- **Conservation Lands Prioritization Assessment Score (1–10 Points):** (see Appendix F, “Conservation Lands Prioritization”)
  - 81–100 Score (10 Points)
  - 61–80 Score (8 Points)
  - 41–60 Score (6 Points)
  - 21–40 Score (4 Points)
  - 0–20 Score (2 Points)
- **Land Conservation Status - (1-10 Points)**
  - High conservation status (10 Points) – Primary use is land conservation. These include conservation easements, conservancy lands, preserves, parks, sovereign lands devoted to conservation practices.
  - Some conservation status (6 Points) – Areas with one or more uses including federal land with alternative uses (e.g., Bureau of Land Management, US Forest Service, US Bureau of Reclamation, US Department of Energy, US Department of Defense), sovereign lands with one or more uses other than conservation.
  - No conservation status (2 Points) – No official conservation status; however, an agreement may be in place with private/residential landowner.



## Enhancement and Restoration Project Assessments Scoring Sheet

**Name of Assessment Scorer:**

**Date of Assessment:**

**Name of Project:**

**Location of Project:**

| Criterion                                                              | Point Score | Notes |
|------------------------------------------------------------------------|-------------|-------|
| Enhancement/ Restoration Design<br>(1–15 Points)                       |             |       |
| Urgency and Severity of Threat<br>(1–15 Points)                        |             |       |
| Problem Resolution<br>(1–15 Points)                                    |             |       |
| Maintenance and Monitoring Plan<br>(1–15 Points)                       |             |       |
| Collaborative Engagement<br>(1–10 Points)                              |             |       |
| Cost Effectiveness<br>(1–10 Points)                                    |             |       |
| Conservation Lands Prioritization<br>Assessment Score<br>(1–10 Points) |             |       |
| Land Conservation Status<br>(1–10 Points)                              |             |       |
| TOTAL<br>(Out of 100 Points)                                           |             |       |



# Appendix I.

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## Land Acquisition Flow Chart

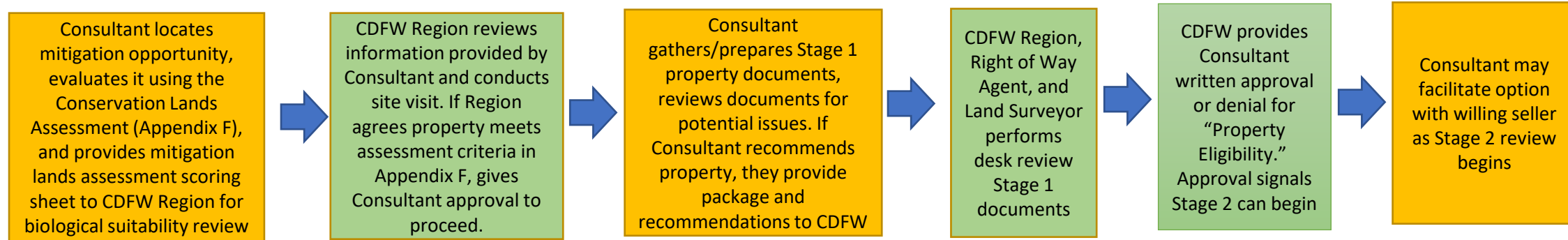


# Western Joshua Tree RPF Land Acquisition Flowchart

\*This is the typical workflow; however, these steps may occur out of order in some situations

## STAGE 1

**Property Eligibility**  
Preliminary review for biological suitability and title issues



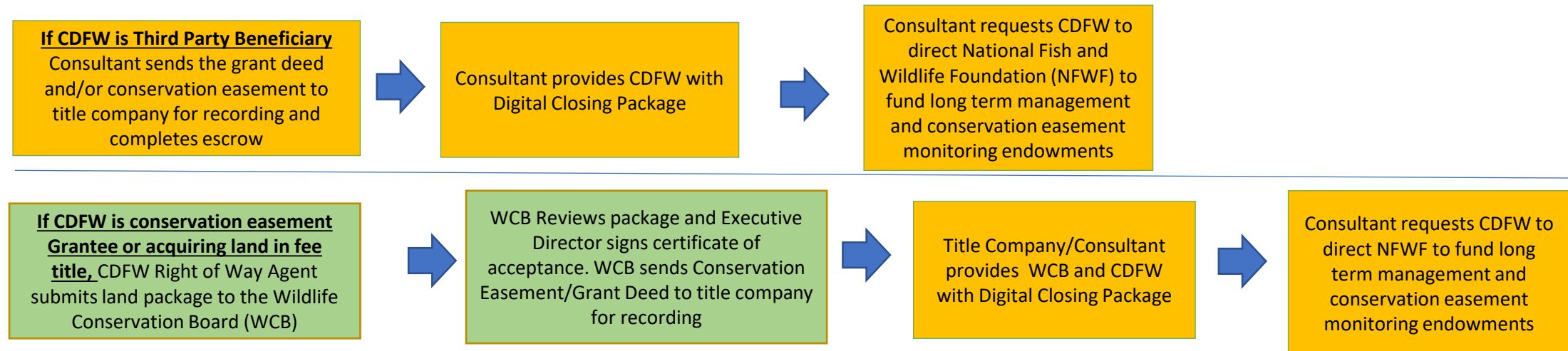
## STAGE 2

**Property Acceptance**  
Full land package review if property found eligible by CDFW in Stage 1



## STAGE 3

**Property Protection and Closing Documentation**  
Closing and Recording of Documents







# WESTERN JOSHUA TREE CONSERVATION PLAN

*June 2025 Fish and Game Commission Meeting*

**PRESENTED BY:**

Drew Kaiser - California Department of Fish and Wildlife



# Presentation Outline

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- Plan Updates
- Public Comment Consideration
- Western Joshua Tree Conservation Act (WJTCA) Timeline
- Plan Approval

Photo: Adobe Stock



# Plan Updates

# WJTCP Updates – Chapters 1, 2, 3, & 6

**Chapter 1 – Introduction**

**Chapter 2 – Planning Influences**

**Chapter 3 – Tribal Values and Uses**

**Chapter 6 – Implementation**

- No substantial changes to these chapters





# WJTCP Updates – Chapter 4



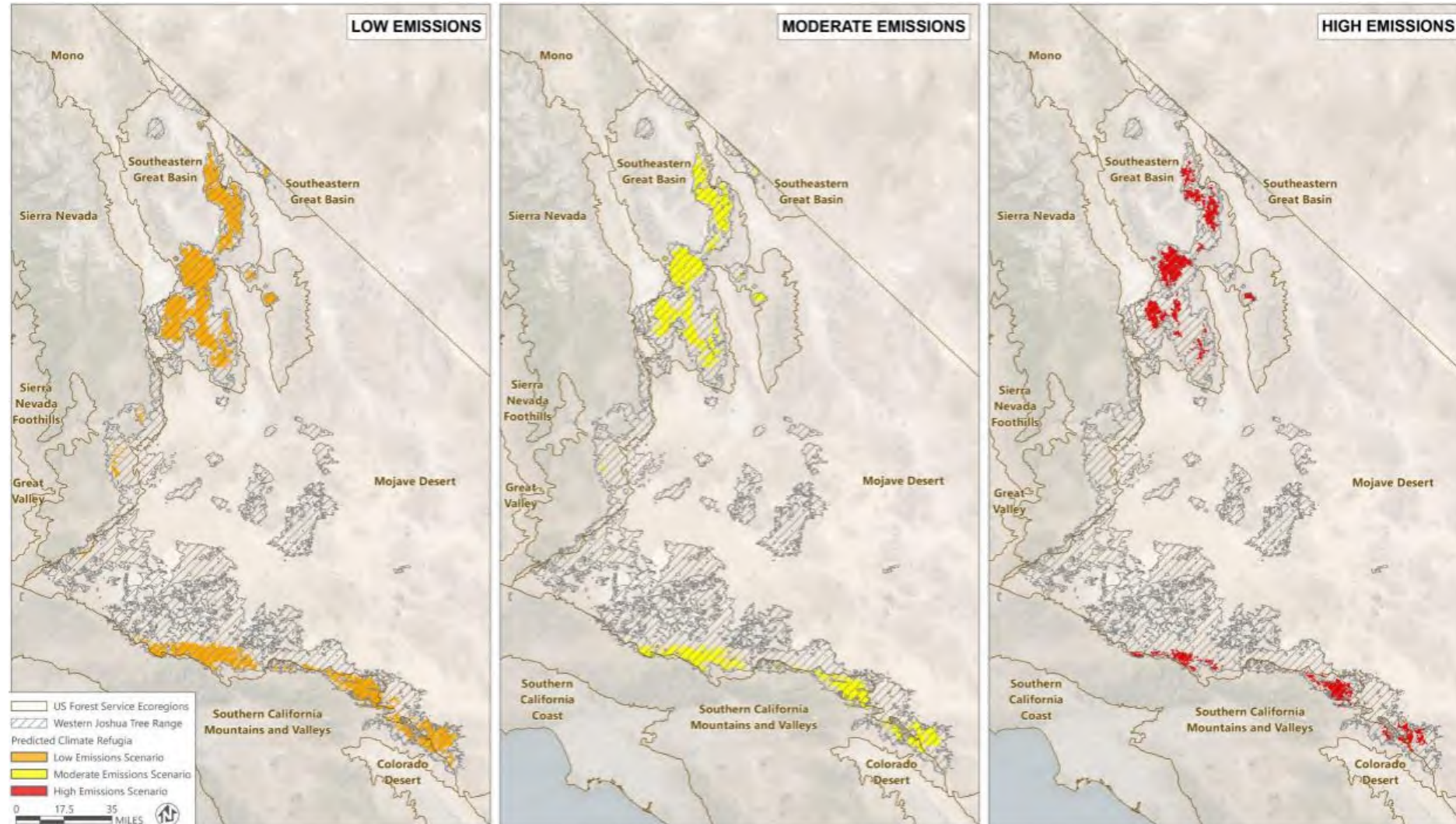
Photo: Jeb Bjerke

## Chapter 4 – Summary of Resources

- Inclusion of USGS's publicly released future suitable habitat climate model data and maps
- Added low-, moderate-, and high-emission scenario climate refugia maps



# WJTCP Updates – Climate Refugia

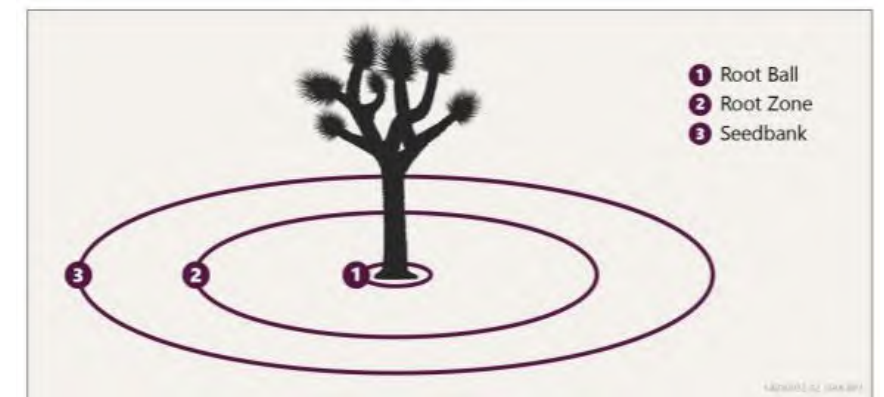


# WJTCP Updates – Chapter 5

## Chapter 5 – Management Actions and Effectiveness Criteria

- Added LC&M 4.4: Assisted Migration through Connectivity Corridors
- Updated Action A&M 1.2: Implement Avoidance Buffers
  - Outlined the purpose and protections of each zone
  - Removed specific distances to reflect project-by-project flexibility
  - Simplified buffer language
- Updated effectiveness criteria

Photo: Adobe Stock



# WJTCP Updates – Appendix

## Appendix E. Relocation Guidelines and Protocols

- Exemptions for single, single family residential projects
- Updated Relocation Areas
- Added “Evaluation of Legal and Technical Limitations” section
- Updated guidelines and protocols

|                           | Bare root relocation | Tree spade relocation |
|---------------------------|----------------------|-----------------------|
| Size Class A (<1 m)       | 18%                  | 9%                    |
| Size Class B (≥1m and <5) | 12%                  | 6%                    |
| Size Class C (≥5m)        | 6%                   | 3%                    |



# Public Comment Consideration



# Comment Considerations

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|                                              |                                                 |                                          |
|----------------------------------------------|-------------------------------------------------|------------------------------------------|
| Definitions (take, conservation)             | Illegal dumping                                 | Nurse plants                             |
| Impacts from large development projects      | Mitigation banks                                | Yucca moths                              |
| Use of climate refugia data                  | Proportionality                                 | Asexual vs. sexual reproduction          |
| Management Units                             | RCISs                                           | Precipitation/soil moisture requirements |
| Relocation (feasibility, receptor sites)     | Relation to the CDFW Status Review              | Recruitment/population structure         |
| Permitting (feasibility, transparency, CEQA) | Wildland urban interface/Urban ecology          | Species distribution models              |
| Buffers (seed, roots)                        | Data analysis                                   | Clonal growth                            |
| Interaction with federal agencies            | Fiscal responsibility/cost of implementation    | Direct vs. indirect effects              |
| Uses of the WJTCF                            | Delegation agreements (annual reporting, WJTCF) | Fire trends                              |
| Low conflict siting                          | Defensible space                                | OHV impacts                              |
| Tribal monitoring                            | Hazard trees                                    | Conservation Easements                   |
| Exemptions (SFR, utility, in-fill)           | Extending deadline for adoption/comments        | Restoration plantings                    |
| Desert Native Plant Specialists              | Support of the Plan                             | No endowments                            |
| Fees (inequity, too high, too low)           | Soil erosion                                    | Pesticide use                            |
| Tracking progress                            | Genetic mixing/genetic adaptation               | Expansion of state/county parks          |
| Assisted migration                           | Grazing                                         | Fragmentation/connectivity               |
| Effectiveness Criteria (measurable, 90%)     | Ground water withdrawal                         | Disturbance caps                         |
| Environmental Justice                        | Desert Tortoise Critical Habitat                | Mining reclamation is avoidance          |
| The boundary of the GFA                      | Soil microbiology/mycorrhizae                   | Mulch fires                              |
| Invasive species                             | Herbivory                                       | Mojave Desert Ecological Assessment      |
| Tribal relocation                            | Non-Governmental Organizations                  | Utilities/infrastructure maintenance     |
| Seed collection/storage                      | Seed dispersers (small mammals, ground sloths)  | Regulatory language                      |



# WJTCA Timeline

# WJTCA Timeline

## Conservation Plan

- Review and update Plan by August 31, 2026
- Review and update Plan every two years after 2026

## Fees

- Adjust fees by December 31, 2026
- Fee adjustment every three years after 2026

## Legislative Report

- [Report submitted by January 2025](#)
- Report will be submitted by January 31 of each year

Photo: Drew Kaiser



# Plan Approval

# WJTCA Requirements

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## Plan Requirements:

- ✓ Management Actions
- ✓ Effectiveness Criteria
- ✓ Avoidance & Minimization Guidance
- ✓ Relocation Protocols
- ✓ Collaboration
  - ✓ Agencies
  - ✓ CA Native American Tribes
  - ✓ Public



# Department Recommendation

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The Department finds the Western Joshua Tree Conservation Plan has met the requirements of the Western Joshua Tree Conservation Act and recommends that the Commission **adopt** the Western Joshua Tree Conservation Plan.





**THANK YOU!**  
*Drew Kaiser, [wjt@wildlife.ca.gov](mailto:wjt@wildlife.ca.gov)*





# Summary of Changes to Western Joshua Tree Conservation Plan – June 2025

## Chapter 1 - Introduction

- No substantive changes to content
- Minor edits:
  - Clarifying language on the Fish and Game Commission's role "approval" to "final action", "approve" to "approval" (pgs. 1-6, 1-7, 1-8, 1-17).
  - Updated language to include February 2025 inter-Tribal community workshop (pgs. 1-12, 1-13).
  - Updated language to include March 2025 public workshop (pg. 1-14).
  - Minor formatting, grammatical, and punctuation edits

## Chapter 2 – Planning Influences

- No substantive changes to content
- Minor edits:
  - Updated figure and table source format for consistency (pgs. 2-11, 2-17, 2-21, 2-23, 2-25, 2-28, 2-31, 2-34, 2-40, 2-42, 2-45, 2-46, 2-50, 2-51, 2-56, 2-57, 2-65, 2-66).
  - Updated some in-text references in response to correction of order of references in Chapter 9 (pgs. 2-35, 2-37, 2-38).
  - Added in-text edits for references that were missing (pgs. 2-49, 2-60).
  - Reverted to citing 2015 SWAP citation since 2025 version is not yet available (pg. 2-54).
  - Added Antelope Valley Conservancy and Bureau of Indian Affairs (BIA) lands to Land Ownership table 2-1 (pg. 2-2).
  - Updated State Wildlife Action Plan information (pg. 2-54).
  - Added short discussion (1 paragraph) on Water Districts in "Utilities and Special Districts" (pg. 2-69).
  - Minor formatting, grammatical, and punctuation edits

## Chapter 4 – Summary of Resources

- Added information on clonal growth habitat of western Joshua trees (pg. 4-30).
- Climate refugia data edits:
  - Added climate refugia maps (pg. 4-39).

- Added brief explanation of the emissions scenarios where climate refugia maps are first referenced (pg. 4-38).
  - Made corresponding edits to text (including updates to figure numbering) and updated in-text references to climate refugia data (pgs. 4-43, 4-44, 4-47, 4-49, 4-50, 4-51, 4-52, 4-53, 4-54, 4-55, 4-58, 4-59, 4-60, 4-64, 4-67, 4-70, 4-72).
- Minor clarifications and grammatical and punctuation edits

## Chapter 5 – Management Actions

- Action A&M 1.2, Implement Avoidance Buffers edits:
  - Clarified purpose of zones/what each zone is aiming to protect (pg. 5-10),
  - Removed buffer measurements and simplified language (pgs. 5-10, 5-11).
- Updated language in Action A&M 2.2 on low-conflict siting for large development projects (pgs. 5-12, 5-13).
- Clarified language in Action A&M 2.4 on where seed could be useful (pg. 5-14).
- Updated language in LC&M 1 on protecting unoccupied future suitable habitat (short-distance, stepping-stone habitat) (pgs. 5-18, 5-19, 5-20, 5-21).
- Added section LC&M 4.4, Assisted Migration through Connectivity Corridors (pg. 5-30).
- R&I 1.12, Investigate Assisted Migration edits:
  - Added additional discussion of, and references to, assisted migration (pg. 5-41).
  - Edited the title for Figure 5.2, "Potential Assisted migration areas where natural migration is unlikely" (pg. 5-42).
- Updated Effectiveness Criteria language (pgs. 5-46, 5-47).
- Updated Priority Actions for Management Units language (pg. 5-49).
- Updates related to assisted migration action added in LC&M section (pg. 5-7).
- Updated in-text references to climate refugia data (pgs. 5-3, 5-7, 5-19, 5-30, 5-41, 5-42, 5-53).
- Minor grammatical and punctuation edits

## Chapter 6 - Implementation

- No substantive changes to content
- Updated Permitting language how WJTCA controls permitting, not the WJTCP (pgs. 6-11, 6-12).
- Updated In Lieu Fees language about fee adjustment and how fees set forth in

WJTCA may disproportionately affect low-income residents and single-family homeowners (pgs. 6-16, 6-17).

- Minor edits:
  - In-text references correction (pg. 6-9).
  - Minor grammatical and punctuation edits

## References

- Updated reference for climate refugia data (pgs. 9-26, 9-36).
- Additional references added and deletion of reference not referenced in text in Chapter 5 (pgs. 9-3, 9-4, 9-5, 9-6, 9-7, 9-8, 9-9, 9-10).
- Edits to website links that were no longer active and including links (pgs. 9-6, 9-9, 9-10, 9-20, 9-31, 9-32).
- Minor edits to grammar, chronological order, and punctuation, and updating document names that have been finalized, author name clarification

## Appendix C – Tribal Input Summary

- Clarified how contact list of Tribes was generated (pg. 2).
- Added information on which emails were sent to which Tribes (pg. 4).
- Added attendees and presentation topics for the February two-day workshop (pg. 4).
- Minor clarifications and grammatical and punctuation edits.

## Appendix D – Avoidance and Minimization

- Updated link in reference (pg. D-8).

## Appendix E – Relocation Guidelines and Protocols

- Updated bare root and tree spade relocation percentages in Table 1
- Updated “WJT Salvage Requirement Calculator spreadsheet”
- Updated “CDFW’s Relocation Plan template”
- Relocation Requirement Considerations edits:
  - Simplified thresholds for when relocation will be required.
  - Included exemptions for single, single-family residential projects.
  - Reduced recommended relocation percentages.
- Relocation Distance and Selection Criteria edits:
  - Updated language to prioritize relocation locations within 16 kilometers, but no more than 50 kilometers from the salvage tree’s original location.
  - Updated language for relocation distance to be within 200 meters of the salvage tree’s original elevation.

- Added language that assisted migration opportunities will be evaluated on a case-by-case basis.
- Added “Evaluation of Legal and Technical Limitations” section.
- Clarified language that site visits can be conducted by a technician with relevant experience; a Desert Native Plant Specialist is not necessarily required.
- Minor clarifications and grammatical and punctuation edits.

## Appendix F – Conservation Lands Prioritization Assessment

- Updated in-text reference and full reference to climate refugia data (pgs. F-2, F-6).
- Removed “2.5 kilometer” from criteria referencing the buffered climate refugia category for consistency with the Conservation Plan (pg. F-3).





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## CEQA STATUTORY EXEMPTION FOR RESTORATION PROJECTS (SERP) CONCURRENCE REQUEST

Completion and submission of this form is voluntary. This form may be submitted to request concurrence from the Director of Fish and Wildlife pursuant to Public Resources Code section 21080.56.

The Lead Agency may submit this signed form (pdf) and all attachments via the Department's [Environmental Permit Information Management System \(EPIMS\) Document Repository](#) or via email at [restorationpermitting@wildlife.ca.gov](mailto:restorationpermitting@wildlife.ca.gov).

### 1. LEAD AGENCY

|                             |                                                    |
|-----------------------------|----------------------------------------------------|
| Lead Agency Name:           | California Fish and Game Commission (Commission)   |
| Contact Person's Name:      | Melissa Miller-Henson                              |
| Street Address:             | 715 P Street (16th Floor)                          |
| City, State, Zip:           | Sacramento, CA, 95814                              |
| Contact Person's Telephone: | (916) 653-4899                                     |
| Contact Person's E-mail:    | <a href="mailto:fgc@fgc.ca.gov">fgc@fgc.ca.gov</a> |

### 2. PROJECT PROPONENT

☐ Check Box and Skip to Number 3 if Same as Lead Agency

|                               |                                                                                  |
|-------------------------------|----------------------------------------------------------------------------------|
| Business/Agency/Organization: | California Department of Fish and Wildlife (CDFW)                                |
| Contact Person's Name:        | Drew Kaiser                                                                      |
| Street Address:               | 1010 Riverside Parkway                                                           |
| City, State, Zip:             | West Sacramento, CA 95605                                                        |
| Contact Person's Telephone:   | (916) 224-6469                                                                   |
| Contact Person's E-mail:      | <a href="mailto:andrew.kaiser@wildlife.ca.gov">andrew.kaiser@wildlife.ca.gov</a> |

### 3. PROJECT INFORMATION

|                                       |                                                                                                                                                                                                                        |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A. Project Name:                      | Western Joshua Tree Conservation Plan (Conservation Plan or Project)                                                                                                                                                   |
| B. County or Counties:                | Statewide                                                                                                                                                                                                              |
| C. Lat./Long. Coordinates:            | Approximately centered at 35.299517, -117.733488                                                                                                                                                                       |
| D. Estimated Project Start/End Dates: | The Commission expects to consider approving the Conservation Plan at a Commission meeting on June 11, 2025. The Conservation Plan will be effective upon Commission approval and will remain in effect until amended. |

E. Provide a brief description of the future discretionary Project approval the Lead Agency is considering (see CEQA Guidelines sections 15352 and 15378) and an approximate date range for when the Lead Agency may make that approval if the Lead Agency obtains a SERP concurrence from CDFW.

The Commission will consider approving the Conservation Plan, which would be a discretionary approval under the California Environmental Quality Act (CEQA), at the June 11-12, 2025 Commission meeting. The purpose of



the Conservation Plan is to fulfill the requirements articulated in the Western Joshua Tree Conservation Act (WJTCA), codified in Fish and Game Code section 1927.6. The Commission is the CEQA lead agency responsible for taking final action on the plan by June 30, 2025 (Fish & G. Code, § 1927.6, subd. (a)). For purposes of this concurrence request, the Project does not include future amendments to the Conservation Plan, implementation of management actions described in the Conservation Plan, or any development activities.

F. Provide a brief description of the Project location, size, and funding sources. Please cite and attach any supporting documents.

The Conservation Plan provides a comprehensive set of management actions essential to conserve western Joshua tree (*Yucca brevifolia*) in California. The management actions include guidance to avoid and minimize direct and indirect impacts to western Joshua trees, land conservation and management strategies, tribal co-management objectives, research and information gathering that will help inform future conservation, and an approach to provide public education and awareness on western Joshua tree conservation issues. A complete copy of the Conservation Plan, dated June 2025, is included with the concurrence request as Attachment A.

The Conservation Plan includes a geographic focus area encompassing 37,749 square kilometers (9,327,981 acres or 14,575 square miles) in portions of San Bernardino, Kern, Los Angeles, Riverside, Inyo, Mono, Tulare, and Ventura counties in southeastern California, which reflects the location of currently occupied western Joshua tree habitat plus an 8-kilometer (5-mile) buffer to encompass areas that could be suitable for implementation of conservation management actions. Figure 1-2 of the Conservation Plan depicts the boundaries of the geographic focus area (Attachment A, Conservation Plan). Figure 1-1 of the Conservation Plan generally depicts currently occupied habitat; however, some areas beyond this boundary have been identified as potential long-distance assisted migration areas provided research shows this could be an effective management action (see Action R&I 1.12 "Investigate Assisted Migration where Natural Migration is Unlikely" in Section 5.2.4, "Research to Inform Long-Term Conservation").

The State General Fund was used to fund the development of the Conservation Plan. In addition, the Wildlife Conservation Board provided grant funding to the Native American Land Conservancy (NALC) to reimburse California Native American tribes (Tribes) for time spent contributing to the development of the Conservation Plan.

G. Provide a brief Project description, including any post-restoration work, operation and maintenance, or other related activities. Summarize the Project's expected environmental benefits (e.g., acres or stream-miles restored/enhanced, species benefitted, etc.). Please cite and attach any supporting documents.

The Conservation Plan provides guidance designed to prevent the extinction of western Joshua tree in the wild, preserve functioning ecosystems that support western Joshua tree, and maintain sustainable populations of western Joshua tree in California over the long-term, such that listing the species under the California Endangered Species Act (CESA) will not be warranted. The Conservation Plan identifies the most urgent and important management actions to guide and inform western Joshua tree conservation, and outlines criteria to help determine the effectiveness of management actions. The Conservation Plan also discusses monitoring of management outcomes, as well as a process to inform and improve the management actions over time.

The Conservation Plan was developed by CDFW in collaboration with the Commission; Tribes; federal, state, and local government agencies; and the public. The Conservation Plan includes a description of management actions necessary to conserve western Joshua tree; objective, measurable criteria to assess the effectiveness of those actions; guidance for the avoidance and minimization of impacts to western Joshua trees; and advisory protocols for the successful relocation of western Joshua trees. The Conservation Plan was developed based on scientific information available to CDFW, incorporates traditional ecological knowledge, and includes tribal co-management principles.

The following provides a summary of the categories of management actions identified in the Conservation Plan:

- Impact avoidance and minimization actions provide guidance to avoid direct and indirect impacts on western Joshua tree. This category also includes activities to minimize impacts on western Joshua tree



from wildland fire through fire risk reduction, suppression, and post-fire restoration (see Section 5.2.1, “Impact Avoidance and Minimization,” of the Conservation Plan).

- Land conservation and management actions are intended to permanently protect western Joshua tree habitat from development and other incompatible human uses, maintain environmental conditions that promote viable populations of western Joshua trees, and establish long-term funding to manage these lands (see Section 5.2.2, “Land Conservation and Management,” of the Conservation Plan).
- Tribal co-management actions are aimed at guiding future decision making and co-management practices. Actions include integrating tribal values, knowledge, and priorities into the management of tribal land or other properties occupied by or suitable for western Joshua tree that may be of religious and cultural significance to Tribes (see Section 5.2.3, “Tribal Co-Management,” of the Conservation Plan).
- Research to inform long-term conservation actions identify research gaps that need to be addressed to improve our scientific understanding of the biology and ecology of western Joshua tree (e.g., conducting genetic studies, investigating fire resilience and postfire recovery) (see Section 5.2.4 “Research to Inform Long-Term Conservation,” of the Conservation Plan).
- Education and awareness actions are designed to enhance public understanding of western Joshua tree ecology, foster community, connect people with their natural world, and inspire people to support conservation of the species. Actions include supporting Tribe-led and designed programs, supporting volunteer opportunities, and encouraging urban conservation (see Section 5.2.5, “Education and Awareness,” of the Conservation Plan).

The following provides a summary of the effectiveness criteria included in the Conservation Plan (see Section 5.3.1, “Effectiveness criteria for Conservation of Western Joshua Tree in California,” of the Conservation Plan):

- By 2033, when the Commission must reconsider whether listing western Joshua tree is warranted, a large and genetically representative distribution of western Joshua tree is permanently protected and managed within 70 percent of priority conservation lands (see Management Actions LC&M 1, LC&M 2, and LC&M 3 in Section 5.2.2 and Appendices F and H of the Conservation Plan).
- A program to monitor and assess western Joshua tree population status based on science is developed and adopted and assessments under the program demonstrate that populations of western Joshua tree are sustainable in California for the foreseeable future (see Management Actions LC&M 3 and LC&M 4 in Section 5.2.2 of the Conservation Plan).
- Cooperative multiagency strategies are implemented to reduce fire risk, fight wildland fires that threaten western Joshua trees, and fund restoration plans in response to wildland fires (see Management Action A&M 3 in Section 5.2.1 of the Conservation Plan).
- Ninety (90) percent of land within California’s predicted climate refugia that is ecologically core, ecologically intact, or moderately degraded when conservation lands are identified under low, moderate, or high emissions scenarios is permanently protected and managed to maximize ecological function for the species and its co-occurring native species (see Section 4.4, “Management Units;” Management Actions LC&M 2 and LC&M 3 in Section 5.2.2; Section 5.4, “Priority Management Actions for Management Units;” and Appendices F and H of the Conservation Plan).
- CDFW identifies initial draft priority conservation areas by December 2025 (see Management Action LC&M 1, Section 5.2.2 and Appendix F of the Conservation Plan).
- The acreage of priority conservation lands preserved in perpetuity increases by 3 to 5 percent every 2 years until the effectiveness criteria related to land protection for conservation of western Joshua tree in California are achieved (see Management Action LC&M 2 in Section 5.2.2 of the Conservation Plan).
- Establishment and sufficient funding of an endowment to fund management of conservation lands (see Management Action LC&M 3 in Section 5.2.2 of the Conservation Plan).



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- By 2033, there is at least one US Fish and Wildlife Service-approved agreement that protects and safeguards priority conservation lands representing at least 10 percent of occupied western Joshua tree range on federally owned lands (see Management Actions LC&M 2 and LC&M 3 in Section 5.2.2 of the Conservation Plan).
- By 2028, there is at least one agreement between CDFW or other land managers and Tribes incorporating co-management principles (see Management Actions TCM 1 and TCM 2 in Section 5.2.3 and Appendix G of the Conservation Plan).
- The number of local jurisdictions that incorporate the Conservation Plan's avoidance and minimization measures into plans and policies increases every 2 years (see Management Actions A&M 1 and A&M 2 in Section 5.2.1 and Appendix D of the Conservation Plan).
- The number of jurisdictions that implement guidance for avoiding direct impacts on western Joshua trees during wildland fire suppression and control activities, for fuel treatment implementation, and for preventing accidental ignition of fires during other activities (e.g., construction, recreation) increases every 2 years (see Management Action A&M 3 in Section 5.2.1 and Appendix D of the Conservation Plan).

Implementation of management actions may be carried out by Public agencies, non-governmental organizations, corporations and other business entities, Tribes, researchers, and private citizens may implement management actions that are identified in or informed by the Conservation Plan, but for purposes of CEQA and this concurrence request, implementation of such management actions would be projects that are separate from the Conservation Plan for purposes of CEQA.

H. CDFW recommends direct coordination with all interested California Native American tribes. Please provide a summary of the Lead Agency's engagement with tribes. Be careful not to include any sensitive or confidential information. Please cite and attach any supporting documents.

The WJTCA requires CDFW to collaborate with Tribes and include traditional ecological knowledge and tribal co-management principles into the Conservation Plan (Fish & G. Code, § 1927.6, subds. (a) and (b)). At CDFW's request, the Native American Heritage Commission provided a list of contacts for 170 federally and non-federally recognized Tribes culturally affiliated with the geographic focus area of the Project. Through email invitations, hard-copy letters, and phone calls, CDFW notified these Tribes of available opportunities to engage in the development of the Conservation Plan.

In coordination with the Commission, CDFW prepared and mailed joint consultation invitation letters to notify Tribes of the development of the Conservation Plan and to request tribal input. Tribes were invited to participate in facilitated meetings led by NALC, informational meetings or tribal listening sessions with CDFW, and consultation meetings with CDFW and/or the Commission. Currently, 17 Tribes have participated in one or more of these engagement options.

A community workshop sponsored by NALC and the Lone Pine Paiute-Shoshone Tribe was held to provide tribal communities with an opportunity to gain information about WJTCA and the Conservation Plan, and to assist in the development of the Conservation Plan by sharing information about the cultivation and preservation of western Joshua trees. Sixteen Tribe members from seven Tribes attended the workshop.

The Tribes that have engaged with CDFW and NALC regarding development of the Conservation Plan were invited to review and comment on a preliminary draft of the Conservation Plan.

Tribal outreach and consultation are ongoing and will continue to inform updates to the Conservation Plan. CDFW will continue to work with all Tribes interested in engaging in co-management practices with CDFW and in receiving western Joshua trees relocated from other areas. Tribes will also have opportunities to review and comment on the future versions of the Conservation Plan.

A detailed summary of CDFW's tribal engagement and collaboration process, which was completed in accordance with CDFW's Tribal Communication and Consultation Policy and the Commission's Tribal Consultation Policy, is provided in Section 1.3.2, "California Native American Tribes," and Appendix C, "Tribal



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Input Summary Memo,” of the Conservation Plan. Foundational commitments by CDFW for continuing development of co-management principles with Tribes are described in Appendix G of the Conservation Plan.

I. CDFW recommends public outreach and coordination with interested parties and public agencies. Please provide a summary of the Lead Agency’s engagement with interested parties and public agencies. Please cite and attach any supporting documents.

In addition to the collaboration with Tribes described above, the WJTCA requires CDFW to develop the Conservation Plan in collaboration with governmental agencies, the public, and the Commission (Fish & G. Code, § 1927.6, subds. (a) -(b)). During Conservation Plan development, CDFW conducted virtual outreach meetings and focused follow-up meetings with local, state, and federal agencies that own, manage, or have jurisdiction over lands within the Conservation Plan’s geographic focus area. Section 1.3.1, “Local, State, and Federal Government Agencies,” provides a summary of the input CDFW received from various government agency outreach meetings.

CDFW also held two virtual public outreach meetings. Meeting invitations were sent broadly and included, but were not limited to, property owners, trade association representatives, nonprofit land conservancy and conservation association representatives, regulatory consultants, and legislative office representatives. CDFW also emailed invitations to individuals representing communities and organizations working in environmental justice within the Conservation Plan geographic focus area. Section 1.3.3, “Public” and Appendix B, “Agency and Public Input Summary Memo,” of the Conservation Plan provides a summary of the input CDFW received from various public outreach meetings.

CDFW maintains a website dedicated to the Conservation Plan, which provides an overview of the Conservation Plan, updates on the Conservation Plan’s development, directions for providing comments, and important upcoming dates. The website includes an email address, [WJT@wildlife.ca.gov](mailto:WJT@wildlife.ca.gov), by which the public can share suggestions, ask questions, and provide feedback.

An earlier draft of the Western Joshua Tree Conservation Plan was made available for public review starting November 22, 2024. Since then, the Commission has accepted public comments on the plan by email and mail. At the February 12, 2025, Commission meeting, CDFW presented a December 2024 draft of the plan and information regarding ongoing efforts to conserve western Joshua tree. The meeting was open for any interested party to participate and provide comment both in person and virtually; written and verbal comments were received by the Commission and considered for changes to the draft plan.

Following the February Commission meeting, CDFW held two additional virtual public workshops on March 10, 2025, to hear and address additional public comments on the draft Conservation Plan and WJTCA.

On June 3, 2025, CDFW transmitted the Commission the most current draft of the plan, dated June 2025, and attached to this concurrence request as Attachment A.

#### 4. REQUIRED DETERMINATIONS

Using substantial evidence and best available science, provide a determination and explanation for each SERP criteria listed below:

A. The Project is exclusively one or both of the following: (1) a project to conserve, restore, protect, or enhance, and assist in the recovery of California native fish and wildlife, and the habitat upon which they depend, or (2) a project to restore or provide habitat for California native fish and wildlife.





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The Commission has determined that the Conservation Plan is exclusively a project to conserve, restore, protect, or enhance, and assist in the recovery of California native fish and wildlife, focused on conservation of western Joshua tree and the habitat upon which the species depends. This purpose is consistent with the statutory mandate for development of the Conservation Plan in Fish and Game Code section 19217.6.

Please provide an explanation supporting the above determination. Please cite and attach any supporting documents.

The Conservation Plan provides a framework for a statewide approach for conserving western Joshua tree in California. Management actions outlined in the Conservation Plan are intended to conserve, restore, protect, enhance, and assist in the recovery of western Joshua tree and its habitat, as well as other species that depend on western Joshua tree.

B. An eligible project may have incidental public benefits, such as public access and recreation.

The Commission has determined that the Conservation Plan may have incidental public benefits as an educational resource.

Please provide an explanation supporting the above determination. Please cite and attach any supporting documents.

The Commission has determined that the Conservation Plan may have an incidental educational benefit to the public as a science-based planning resource. The Conservation Plan may enhance public understanding of western Joshua tree ecology, foster community pride and involvement in western Joshua tree conservation, connect people with the natural world, and inspire people to care about western Joshua tree and its habitat so they will support and contribute to the conservation of the species.

C. The Project does both of the following: (1) Results in long-term net benefits to climate resiliency, biodiversity, and sensitive species recovery; and (2) Includes procedures and ongoing management for the protection of the environment.

The Commission has determined that the Conservation Plan does both of the following: (1) results in long-term net benefits to climate resiliency, biodiversity, and sensitive species recovery; and (2) includes procedures and ongoing management for the protection of the environment.

For each criterion below, please provide an explanation supporting the above determination. Please cite and attach any supporting documents.

Long-Term Net Benefits to Climate Resiliency:

The Conservation Plan is designed and expected to result in long-term net benefits to climate resiliency. Climate change is one of the primary threats to western Joshua tree. The Conservation Plan provides information about this threat and discusses management actions that will improve the resilience of western Joshua tree as it pertains to climate change. The Conservation Plan highlights the need to investigate the effects of climate variability patterns on western Joshua tree recruitment, survival, and population density (see Action R&I 1.10 in Section 5.2.4 of the Conservation Plan) because understanding the species' tolerance for future environmental conditions (e.g., changes in precipitation levels or frequency, higher or lower temperatures) that would occur as a result of climate change will help determine management actions that ensure its resilience in the long term. The Conservation Plan encourages the use of science-based assisted gene flow methods to introduce climate-adapted genes into stands of western Joshua trees, thereby enhancing their capacity for climate adaptation and resilience (see Management Action LC&M 4 in Section 5.2.2 of the Conservation Plan). The Conservation Plan also identifies the need for continued research to best inform this practice (see Action R&I 1.1 and Action R&I 1.4 in Section 5.2.4 of the Conservation Plan). The Conservation Plan highlights the importance of collecting western Joshua tree seeds to preserve genetic diversity and to provide source material for future restoration in existing habitat or outplanting to other viable locations, such as currently unoccupied habitat modeled as climate



refugia (see Action A&M 2.4 in Section 5.2.1 of the Conservation Plan). The Conservation Plan also encourages research on the feasibility, practicality, effectiveness, and risks of assisted migration into areas modeled as climate refugia to which western Joshua tree cannot naturally migrate (see Action R&I 1.12 in Section 5.2.4 of the Conservation Plan).

The Conservation Plan also includes land conservation and management actions focused on identifying, protecting, and managing climate refugia for western Joshua tree (see Appendix F, “Conservation Lands Prioritization” in the Conservation Plan). For example, the Conservation Plan explains the importance of prioritizing management and conservation efforts on western Joshua tree populations that meet criteria for resiliency to climate change and that have demographic signatures of long-term viability (see Management Action LC&M 1 in Section 5.2.2 of the Conservation Plan). The Conservation Plan also proposes actions to reduce climate change-related stressors to western Joshua tree, such as implementing fuel treatments to reduce the risk of wildland fire (see Management Action A&M 3 in Section 5.2.1 and Actions A&Ms 3.4.1 and 3.5.1 in Appendix D of the Conservation Plan).

The protection, restoration, and enhancement of climate refugia for western Joshua tree would also promote climate resiliency of species that are dependent on or associated with western Joshua tree and its habitat, as well as the broader ecosystem.

Conservation of trees through relocation, as contemplated in the Conservation Plan, will help preserve trees that may otherwise be destroyed. These trees can continue to serve as a carbon sink, helping to alleviate (albeit in to a small degree) greenhouse gas buildup through continued growth and to ensure that carbon already in the plants are not released upon their destruction. The fact that the trees are long-lived ensures what carbon capture does occur will remain for a long time.

#### Long-Term Net Benefits to Biodiversity:

The Conservation Plan is designed and expected to result in long-term net benefits to biodiversity. Western Joshua tree plays an important ecological role in the southwest desert ecosystem. Public agencies, non-governmental organizations, corporations and other business entities, Tribes, researchers, and private citizens may implement management actions that are identified in or informed by the Conservation Plan (as separate future projects), which would benefit western Joshua tree, as well as numerous native organisms that occur in western Joshua tree habitat. Mohave ground squirrel (*Xerospermophilus mohavensis*), which is listed as threatened under CESA, stores and consumes western Joshua tree seeds; and tricolored blackbird (*Agelaius tricolor*), which is also listed as threatened under CESA, has been observed foraging for arthropods within Joshua tree inflorescences. Desert tortoise (*Gopherus agassizii*) is listed as threatened under the Federal Endangered Species Act, is currently listed as threatened under CESA, and is a candidate for listing as endangered under CESA; desert tortoise is known to construct burrows under fallen Joshua tree limbs. Swainson’s hawk (*Buteo swainsoni*), which is listed as threatened under CESA; loggerhead shrike (*Lanius ludovicianus*), a state species of special concern; and other avian species have been documented nesting in western Joshua tree. These species will also benefit from the Conservation Plan. Additionally, the yucca moth (*Tegeticula synthetica*), which is the sole pollinator for western Joshua tree, also relies on the western Joshua tree seeds as food for its larvae, and would also benefit from western Joshua tree conservation. Western Joshua trees are the characteristic species in the Joshua tree woodland alliance and can be found in other vegetation communities, including California juniper woodland, foothill pine woodland, and blackbrush scrub alliances. Native plant species that occur within these vegetation communities, including “nurse plants” (i.e., plants that protect western Joshua tree seedlings) may benefit from management actions described in the Conservation Plan. For example, the Conservation Plan includes guidance for removing and preventing the spread of invasive plant species, which would reduce fire risk and competition for light, space, and nutrients for native plants within these vegetation communities. Native plant species that would likely benefit from western Joshua tree conservation include blackbrush, creosote bush, and singleleaf pinyon pine. In addition, mycorrhizal fungi that live in the soil and form a mutualistic symbiotic relationship with western Joshua tree may benefit from management actions. Refer to Section 4.2, “Wildlife Values and Ecological Function of Western Joshua Tree,” of the Conservation Plan and references therein for additional information.



**Long-Term Net Benefits to Sensitive Species Recovery:**

The Conservation Plan is designed and expected to result in long-term net benefits to western Joshua tree, a candidate for listing under CESA. The Conservation Plan provides a statewide strategy for the conservation of the species. The Conservation Plan was designed to guide and inform the planning of future projects that may affect western Joshua tree. Sections 5.2.2, 5.2.4, and 5.2.5 of the Conservation Plan describe categories of management actions that would result in long-term benefits to western Joshua tree recovery. Specific examples of such management actions include the following:

- Management Action LC&M 4 encourages the use of a comprehensive restoration approach to return ecosystem functions to degraded sites or to enhance a site's resilience, ecological function, and ability to recruit western Joshua trees. The goal of habitat restoration and enhancement is to return the habitat to a self-sustaining condition (see Section 5.2.2 of the Conservation Plan).
- Management Action LC&M 5 highlights the importance of developing and implementing a seed conservation strategy that includes protocols for seed collection, storage, and distribution for conservation and recovery purposes that will ensure long term preservation of a viable, genetically diverse western Joshua tree population (see Section 5.2.2 of the Conservation Plan).
- Action R&I 1.8 emphasizes the need for research on fire resilience and post-fire recovery to better inform land management activities (see Section 5.2.4 of the Conservation Plan).
- Action E&A 1.8 calls for CDFW and local governments to encourage landowners to participate in urban conservation and recovery efforts (see Section 5.2.5 of the Conservation Plan).

The Conservation Plan would also result in long-term benefits to other sensitive wildlife species that occur within western Joshua tree habitat, such as Mohave ground squirrel, Swainson's hawk, and tricolored blackbird, which are listed as threatened under CESA ;, and desert tortoise, which is a candidate to be uplisted from threatened to endangered under CESA and is listed as threatened under the federal Endangered Species Act.

**Procedures for the Protection of the Environment:**

The Conservation Plan includes procedures for the protection of the environment. The purpose of the Conservation Plan is to protect, conserve, and restore Western Joshua tree, its habitat, and other species that co-occur with or rely on western Joshua tree (Pub. Resources Code, § 21060.5; Cal. Code Regs., tit. 14, § 15382).

The Conservation Plan provides guidance for land conservation and management actions that would permanently protect western Joshua tree habitat from development and other incompatible human uses, and describes protocols for acquiring, protecting, and managing those lands (see Section 6.7, "Land Acquisition Protocols").

The Conservation Plan also provides best management practices and protocols to protect the environment during implementation of management actions. Appendix D, "Avoidance and Minimization Best Management Practices and Guidelines," of the Conservation Plan includes measures to: avoid pesticide drift; prevent the spread of invasive plants; reduce the potential for accidental ignition of fires; and minimize loss of western Joshua tree and habitat during fire suppression and control activities, implementation of fuel treatments, and postfire rehabilitation. Appendix E, "Relocation Guidelines and Protocols," provides information and guidance regarding how and when to relocate western Joshua trees to minimize impacts to populations, prevent habitat fragmentation, and preserve connectivity corridors for gene flow and pollinator migration.

**Ongoing Management for the Protection of the Environment:**

The Conservation Plan includes ongoing management for the protection of the environment. The Conservation Plan provides a framework for Land Conservation and Management actions that could be carried out on a long-term basis to ensure that conserved lands continue to support sustained populations of western Joshua trees and the natural processes on which they depend. The Conservation Plan also encourages the development of long-term monitoring and management plans or conservation easement stewardship agreements for conserved



lands per Action LC&M 3.1 (see Section 5.2.2 of the Conservation Plan). These potential, future plans or agreements, which would be separate projects for purposes of CEQA, may include invasive species control, fuel break maintenance, fence repair, garbage removal, monitoring, and adaptive management to avoid, minimize, and remediate ongoing and persistent threats to western Joshua tree (see Management Action LC&M 3 in Section 5.2.2 of the Conservation Plan). Informed by the protocols for land acquisition described in Section 6.7, “Land Acquisition Protocols,” written agreements with state and federal agencies for long-term monitoring and management may benefit western Joshua tree on priority conservation lands (see Action LC&M 3.2 in Section 5.2.2 of the Conservation Plan). In addition, the Conservation Plan highlights the importance of securing funding for long-term land management, which would be necessary to ensure that critical monitoring and management activities are implemented (see Action LC&M 3.3 in Section 5.2.2 of the Conservation Plan). The Conservation Plan also includes guidance for establishing co-management principles in collaboration with Tribes that would allow for ongoing management for the protection of the environment (see Action TCM 1 in Section 5.2.3 of the Conservation Plan). Further, Appendix E, “Relocation Guidelines and Protocols,” provides guidance and protocols for increasing the survival rate of relocated western Joshua trees, including information on post-relocation maintenance, monitoring, and reporting (see Action R&I 1.11 in Section 5.2.4 of the Conservation Plan).

The Conservation Plan provides guidance for evaluating whether the effectiveness criteria have been met (included in Section 5.3 of the Conservation Plan), including the collection of western Joshua tree data to monitor and assess the species’ population status. The Conservation Plan also discusses metrics that measure the effectiveness of the management actions and recommends development of new or more refined effectiveness criteria as new information is gathered. CDFW will also prepare and submit to the Commission an annual report assessing the conservation status of western Joshua tree and actions taken, informed by the Conservation Plan, as required by the WJTCA (Fish & G. Code, § 1927.7, subd. (a); see also Section 6.5, “Permitting and Regulations” of the Conservation Plan).

The Conservation Plan describes a process to evaluate the efficacy of implemented management actions in Section 1.5, “Western Joshua Tree Conservation Adaptive Management Framework” and Section 6.8.3, “Plan Amendments and Adaptive Management.” Starting in 2026 and at least every 2 years thereafter, the Commission will review the status of western Joshua tree and the effectiveness of the Conservation Plan in conserving the species at a public meeting held prior to August 31 (Fish & G. Code, § 1927.8). In conjunction with each review, CDFW will recommend to the Commission amendments to the Conservation Plan, as necessary to ensure the conservation of the species.

D. The Project does not include any construction activities, except for construction activities solely related to habitat restoration.

The Commission has determined the Conservation Plan does not include any construction activities.

Please provide an explanation supporting the above determination. Please cite and attach any supporting documents.

The Conservation Plan is a planning document for the recovery of western Joshua tree. Approval of the Conservation Plan would not directly authorize or result in any construction activities, whether solely related to habitat restoration or otherwise. The only connection that the Conservation Plan may have to any construction activities is by informing potential management actions to help conserve western Joshua tree or avoidance, minimization, and mitigation measures for future development activities that may impact western Joshua tree. Measures may be required as part of approval or permitting processes for construction activities. For purposes of CEQA, any such future construction activities or management actions will be undertaken as projects that are separate from the Conservation Plan; no public agency should rely on this concurrence request and the concurrence from the CDFW Director, should such concurrence be issued, as a basis for complying with CEQA.



State of California – Department of Fish and Wildlife  
**CEQA RESTORATION STATUTORY EXEMPTION REQUEST FORM**  
DFW 21080.56 (New 11/09/23) Page 10

**5. CERTIFICATION**

*I certify that I have the authority to determine whether a project is exempt pursuant to CEQA Guidelines section 15025(a)(1), and this Project meets all the requirements described in Public Resources Code section 21080.56, and that I have submitted all the determinations required therein necessary to obtain the concurrence of the Director of Fish and Wildlife.*

DocuSigned by:  
  
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Date: 6/4/2025

Lead Agency Signature

Printed Name and Title: Melissa Miller-Henson, Executive Director





State of California – Natural Resources Agency  
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**GAVIN NEWSOM, Governor**  
**CHARLTON H. BONHAM, Director**



June 6, 2025

Melissa Miller-Henson  
Executive Director  
Fish and Game Commission  
715 P Street  
Sacramento, CA 95814

**California Environmental Quality Act Statutory Exemption for Restoration Projects –  
Western Joshua Tree Conservation Plan (Request No. 21080.56-2025-073-R6)**

Dear Melissa Miller-Henson:

I am pleased to inform you as the Director of the California Department of Fish and Wildlife (CDFW) that I concur with the lead agency determination by the Fish and Game Commission (Lead Agency) that the Western Joshua Tree Conservation Plan qualifies as a statutorily exempt restoration project under the California Environmental Quality Act (CEQA). (Pub. Resources Code, § 21080.56, subd. (e).) My concurrence as the CDFW Director is based on CDFW's independent review of the Lead Agency request for concurrence, which CDFW received on June 4, 2025. In my opinion, informed by the best available science and described in the separate CDFW concurrence, the Western Joshua Tree Conservation Plan meets all the qualifying criteria in Public Resources Code section 21080.56, subdivisions (a) to (d), inclusive.

This concurrence signifies the continued commitment by CDFW and its partners in advancing the "Cutting the Green Tape" initiative, which is a collaborative effort to increase the pace and scale of restoration projects in California in a way that protects the environment and results in long-term net benefits to climate resiliency, biodiversity, and sensitive species recovery. CDFW stands ready to continue this effort in coordination with the Lead Agency.

CDFW's concurrence will be posted on our website as provided by Public Resources Code section 21080.56. If you have any related questions, please contact Brad Henderson, Cutting the Green Tape Program Manager, at (530) 351-5948, or by email at [Brad.Henderson@wildlife.ca.gov](mailto:Brad.Henderson@wildlife.ca.gov).

Sincerely,

A handwritten signature in black ink, appearing to read 'CH Bonham', with a long horizontal stroke extending to the right.

Charlton H. Bonham, Director  
California Department of Fish and Wildlife

cc: **California Department of Fish and Wildlife**

Valerie Termini  
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**CALIFORNIA ENVIRONMENTAL QUALITY ACT STATUTORY EXEMPTION FOR  
RESTORATION PROJECTS (SERP)  
CONCURRENCE NO. 21080.56-2025-073-R6**

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**Project:** Western Joshua Tree Conservation Plan  
**Location:** Statewide  
**Lead Agency:** California Fish and Game Commission  
**Lead Agency Contact:** Melissa Miller-Henson; [fgc@fgc.ca.gov](mailto:fgc@fgc.ca.gov)

**Background**

In October 2019, the California Fish and Game Commission (Commission or Lead Agency) received a petition to list western Joshua tree (*Yucca brevifolia*) as threatened under the California Endangered Species Act (CESA). The petition identified climate change and wildland fires as the greatest threats to the persistence of the species. The petition included habitat loss due to development; seed and plant predation, especially during drought; and competition with invasive species as other factors affecting the species' ability to survive and reproduce. In September 2020, the Commission found that there was sufficient information indicating that listing the species as threatened under CESA may be warranted and designated western Joshua Tree as a candidate species under CESA.

In February 2023, while the Commission was considering its final decision on the petition, legislation was introduced to protect western Joshua tree. In response to this legislative proposal, the Commission postponed further consideration of the petition. In July 2023, the California State Legislature passed and the governor signed into law the Western Joshua Tree Conservation Act (WJTCA). (Fish & G. Code, § 1927 et seq.) The WJTCA, in part, requires the California Department of Fish and Wildlife (CDFW) to develop and implement a conservation plan for western Joshua tree in collaboration with the Commission, government agencies, California Native American tribes (Tribes), and the public.

On June 3, 2025, CDFW transmitted to the Commission the most current draft of the Western Joshua Tree Conservation Plan, dated June 2025 (Project or Conservation Plan). The Commission will consider approving the Conservation Plan at the Commission's meeting on June 11-12, 2025.

Project Location: The Conservation Plan includes a geographic focus area of approximately 9,327,981 acres in portions of San Bernardino, Kern, Los Angeles, Riverside, Inyo, Mono, Tulare, and Ventura counties. This area reflects the currently occupied western Joshua tree habitat and a five-mile buffer suitable for implementation of future western Joshua tree

management actions. Figure 1-2 of the Conservation Plan depicts the boundaries of the geographic focus area of the plan.

Project Description: The Conservation Plan is intended to guide management actions that will conserve, restore, protect, and assist in the recovery of western Joshua tree and the habitat upon which it depends in California. Management actions include but are not limited to:

- Actions to avoid and minimize impacts on western Joshua tree;
- Actions to conserve and manage land suitable for or serving as western Joshua tree habitat;
- Actions to co-manage western Joshua tree on tribal land and other properties that may be of cultural and religious significance to Tribes;
- Research to inform long-term conservation efforts; and
- Actions to provide public education, awareness, and inspiration to conserve western Joshua tree.

Management actions can be voluntarily pursued by project proponents, land managers, and philanthropists or incorporated into project approvals by local, state, and federal government agencies. The Conservation Plan also considers research needs, tribal co-management strategies, and education and awareness opportunities. The Conservation Plan provides criteria to define the effectiveness of management actions and outlines monitoring and adaptive management processes. The Conservation Plan does not create new statutory or regulatory mandates.

For purposes of the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.) and this concurrence request, the Project does not include future amendments to the Conservation Plan, implementation of management actions identified in or informed by the Conservation Plan, or any development activities.

Tribal Engagement: The WJTCA requires CDFW to consult with Tribes on the development of a conservation plan for western Joshua tree and include traditional ecological knowledge and tribal co-management principles into the plan. (Fish & G. Code, § 1927.6, subds. (a) and (b).) At CDFW's request, the Native American Heritage Commission provided a list of contacts for 170 federally and non-federally recognized Tribes culturally affiliated with the geographic focus area of the Project. In coordination with the Commission, CDFW mailed joint consultation invitation letters to notify Tribes of the development of the Western Joshua Tree Conservation Plan and to request tribal input. Further, through email invitations, hard-copy letters, and phone calls, CDFW invited Tribes to participate in meetings facilitated by the Native American Land Conservancy (NALC), informational meetings or tribal listening sessions with CDFW, and consultation meetings with CDFW and/or the Commission. Currently, 17 Tribes have participated in one or more of these engagement options. The Wildlife Conservation Board awarded grant funding to the NALC to reimburse Tribes for their time spent contributing to the development of the Western Joshua Tree Conservation Plan. Appendix C of the Conservation Plan summarizes CDFW's extensive tribal engagement and collaboration efforts. The Conservation Plan includes traditional ecological knowledge and tribal co-management principles.



CDFW's tribal engagement efforts are ongoing and will continue to inform potential future amendments to the Conservation Plan. CDFW will continue working with all Tribes interested in co-management with CDFW or interested in receiving western Joshua trees relocated from other areas. CDFW's commitments for continuing development of tribal co-management principles are described in Appendix G of the Conservation Plan.

Interested Party Coordination: The WJTCA requires CDFW to collaborate with government agencies, the public, and the Commission on the development of a conservation plan for western Joshua tree. (Fish & G. Code, § 1927.6, subd. (a).) CDFW conducted virtual outreach meetings and focused follow-up meetings with local, state, and federal agencies that own, manage, or have jurisdiction over land within the geographic focus area identified in the Conservation Plan.

CDFW also held more than ten virtual public outreach meetings and workshops to receive input on the Conservation Plan. Attendees included, but were not limited to, property owners, land conservancies, regulatory consultants, and environmental justice representatives. Earlier drafts of the Western Joshua Tree Conservation Plan were made available for public review. The Commission provided the opportunity for interested parties to provide comment either in-person or virtually at multiple Commission meetings. The Conservation Plan reflects CDFW's consideration of all input received on earlier drafts of the Western Joshua Tree Conservation Plan. Appendix B of the Conservation Plan summarizes the input received during public outreach meetings.

Anticipated Project Timeframe: The Commission will consider approving the Conservation Plan at the Commission meeting on June 11-12, 2025. The Conservation Plan will become effective upon Commission approval and will remain in effect until amended.

Lead Agency Request for CDFW Concurrence: On June 4, 2025, the Director of CDFW (CDFW Director) received a concurrence request from the Lead Agency pursuant to Public Resources Code section 21080.56, subdivision (e) (Request). The Request seeks the CDFW Director's concurrence with the Lead Agency's determination on June 4, 2025, that the Project meets certain qualifying criteria set forth in subdivisions (a) to (d), inclusive, of the same section of the Public Resources Code (Lead Agency Determination). The CDFW Director's concurrence is required for the Lead Agency to approve the Project relying on this section of CEQA.

### **Concurrence Determination**

The CDFW Director concurs with the Lead Agency Determination that the Project meets the qualifying criteria set forth in Public Resources Code section 21080.56, subdivisions (a) to (d), inclusive (Concurrence).

Specifically, the CDFW Director concurs with the Lead Agency that the Project meets all of the following conditions: (A) the Project is exclusively to conserve, restore, protect, or enhance, and assist in the recovery of California native fish and wildlife, and the habitat upon which they depend; or is exclusively to restore or provide habitat for California native fish and wildlife; (B) the Project may have public benefits incidental to the Project's fundamental

purpose; (C) the Project will result in long-term net benefits to climate resiliency, biodiversity, and sensitive species recovery; and includes procedures and ongoing management for the protection of the environment; and (D) Project construction activities are solely related to habitat restoration. Pursuant to Public Resources Code section 21080.56, subdivision (g), CDFW will post this Concurrence on its CEQA Notices and Documents internet page: <https://wildlife.ca.gov/Notices/CEQA>.

This Concurrence is based on best available science and supported, as described below, by substantial evidence in CDFW's administrative record of proceedings for the Project.

This Concurrence is also based on a finding that the Project is consistent with and that its implementation will further CDFW's mandate as California's trustee agency for fish and wildlife, including the responsibility to hold and manage these resources in trust for all the people of California.

## **Discussion**

- A. Pursuant to Public Resources Code section 21080.56, subdivision (a), the CDFW Director concurs with the Lead Agency that the Project will exclusively conserve, restore, protect, or enhance, and assist in the recovery of California native fish and wildlife, and the habitat upon which they depend; or restore or provide habitat for California native fish and wildlife.

The exclusive purpose of the Conservation Plan is to conserve western Joshua tree by preventing the extinction of western Joshua tree in the wild, preserving functioning ecosystems that support western Joshua tree, and maintaining sustainable populations of western Joshua tree. This purpose is consistent with the statutory mandate for development of a conservation plan for western Joshua tree. (See Fish & G. Code, § 1927.6.)

- B. Pursuant to Public Resources Code section 21080.56, subdivision (b), the CDFW Director concurs with the Lead Agency that the Project may have incidental public benefits, such as public access and recreation.

The Conservation Plan may have an incidental public education benefit by serving as a statewide science-based resource guiding the knowledge and conservation of western Joshua tree. Through reading the Conservation Plan, the public will obtain an increased understanding of western Joshua tree ecology. The public may feel inspired to become involved in the implementation of management actions, and in doing so, may strengthen connections with their local ecosystems and communities.

- C. Pursuant to Public Resources Code section 21080.56, subdivision (c), the CDFW Director concurs with the Lead Agency that the Project will result in long-term net benefits to climate resiliency, biodiversity, and sensitive species recovery, and includes procedures and ongoing management for the protection of the environment.

### Long-term Net Benefits to Climate Resiliency:

In the 2019 petition to list western Joshua tree as threatened under CESA, climate change was identified as a primary threat to the species. The Conservation Plan addresses this threat in many ways, including, but not limited to:

- Highlights the need to investigate the effects of climate variability on western Joshua tree recruitment and survival;
- Encourages assisted gene-flow methods to introduce climate-adapted genes into western Joshua tree stands;
- Highlights the importance of collecting western Joshua tree seeds to preserve genetic diversity and provide source material for restoration efforts;
- Encourages research on the feasibility, effectiveness, and risks associated with assisted migration of the species into areas where they cannot naturally migrate but could serve as climate refugia;
- Focuses on identifying, protecting, and managing climate refugia; and
- Identifies actions that reduce climate-change-related stressors on the species, such as (vegetative) fuel treatments.

Many of the management actions identified in the Conservation Plan would allow the scientific community to better understand the species' tolerance to hotter, drier environmental conditions. By improving this understanding, additional management actions can be implemented to support long-term climate resiliency of the species and the habitat upon which it depends.

### Long-term Net Benefits to Biodiversity:

In California, the western Joshua tree is naturally found in the Mojave Desert, the Southeastern Great Basin, and in transition zones of the southern Sierra Nevada and southern California mountains. An abundance of plant and animal species occur in these arid regions and engage in an ecological relationship with western Joshua tree. These species include, but are not limited to, desert night lizards (*Xantusia vigilis*), desert spiny lizards (*Sceloporus magister*), Scott's oriole (*Icterus parisorum*), Ladder-backed woodpeckers (*Dryobates scalaris*), and Navaho yucca borer butterfly (*Megathymus yuccae navajo*). Notably, the yucca moth (*Tegeticula synthetica*) and the Mohave ground squirrel (*Xerospermophilus mohavensis*), which is listed as threatened under CESA, have a mutualistic relationship with western Joshua tree. Yucca moth is the sole obligate pollinator of western Joshua tree, so western Joshua tree relies on yucca moth to produce seeds. Western Joshua tree also relies on rodents, such as the Mohave ground squirrel, to disperse and cache seeds at a soil depth that is suitable for germination. The Conservation Plan provides a framework to conserve western Joshua tree and protect the habitat in which these species co-exist. The implementation of management actions described in the Conservation Plan will provide long-term net benefits to these species, in addition to other native plant and animal species that occur within vegetation and natural communities that support western Joshua tree.

### Long-term Net Benefits to Sensitive Species Recovery:

In addition to western Joshua tree and Mohave ground squirrel, other special status species will experience long-term net benefits from the Conservation Plan. These species include, but are not limited to, tricolored blackbird (*Agelaius tricolor*), which is listed as threatened under CESA; desert tortoise (*Gopherus agassizii*), which is listed as endangered under CESA and threatened under the federal Endangered Species Act; and Swainson's hawk (*Buteo swainsoni*), which is listed as threatened under CESA. Tricolored blackbirds forage on pods within western Joshua tree inflorescences. Desert tortoises construct burrows under fallen western Joshua tree limbs and use canopy for shade. Swainson's hawks nest within western Joshua tree. Special status species will experience long-term net benefits from management actions that focus on the recovery of western Joshua tree populations, as well as from management actions that address habitat conservation and management.

### Procedures for the Protection of the Environment:

To achieve the Conservation Plan's vision, purpose, and objectives, the plan includes five categories of management actions that have been developed and outlines related procedures for the protection of the environment. Appendix D of the Conservation Plan describes avoidance and minimization best management practices that protect the environment during the implementation of management actions. Appendix E of the Conservation Plan provides guidelines and protocols for the relocation of western Joshua trees to minimize impacts on populations, prevent habitat fragmentation, and preserve connectivity. Section 6.7 of the Conservation Plan prioritizes the permanent protection of western Joshua tree habitat from development and other incompatible human uses.

### Ongoing Management for the Protection of the Environment:

Ongoing management actions for the protection of the environment are necessary to achieve the vision, purpose, and objectives of the Conservation Plan. Chapter 4.3 of the Conservation Plan discusses threats to western Joshua tree, including climate change phenomena, development and other incompatible human activities, wildland fire, invasive plant species, and herbivory and predation. Chapter 5 provides recommendations to address these threats through management actions and guidance for evaluating whether effectiveness criteria have been met. Ongoing management actions include, but are not limited to:

- The development of long-term monitoring and management plans, habitat restoration and enhancement plans, and conservation easement stewardship agreements;
- The establishment of endowments and other funding mechanisms for long-term land management;
- Restoration and enhancement of damaged or degraded lands to establish suitable habitat and promote ecosystem recovery;
- Assisted migration, to establish western Joshua tree populations within unoccupied connectivity corridors;

- Development and implementation of a seed conservation strategy, to minimize loss of genetic diversity over time; and
- Research, to inform scientific understanding of the ecology and long-term persistence of western Joshua tree.

The Conservation Plan also addresses opportunities for CDFW to work with local agencies, fire departments, nongovernmental organizations, Tribes, and other entities to assure long-term success of the Conservation Plan. Such opportunities include, but are not limited to:

- Entering into written memoranda of understanding or other agreements with counties and cities to designate protected areas for western Joshua tree;
- Collaboration with local fire departments on fire management strategies that benefit western Joshua tree on private land;
- Coordination with nongovernmental organizations to acquire, protect, and manage land within the western Joshua tree range; and
- Entering into written memoranda of understanding or other agreements with Tribes for co-management of western Joshua tree or its habitat.

- D. Pursuant to Public Resources Code section 21080.56, subdivision (d), the CDFW Director concurs with the Lead Agency that the Project does not include any construction activities, except those solely related to habitat restoration.

The Conservation Plan is a planning document for the recovery of western Joshua tree. Approval of the Conservation Plan would not directly authorize or result in any construction activities, whether solely related to habitat restoration or otherwise. The only connection that the Conservation Plan may have to any construction activities is by informing potential management actions to help conserve western Joshua tree, including avoidance, minimization, and mitigation measures that may be required as part of approval or permitting processes for future development activities. For purposes of CEQA, any such future construction activities will be undertaken as projects that are separate from the Conservation Plan; public agencies shall not use this Concurrence to approve any future construction activities based on Public Resources Code section 21080.56.

### **Scope and Reservation of Concurrence**

This Concurrence is based on the proposed Project as described by the Lead Agency Determination and the Request. If there are any subsequent changes to the Project that affect or otherwise change the Lead Agency Determination, the Lead Agency, or any other public agency that proposes to carry out or approve the Project, shall submit a new lead agency determination and request for concurrence from CDFW pursuant to Public Resources Code section 21080.56. If any other public agency proposes to carry out or approve the Project subsequent to the effective date of this Concurrence, this Concurrence shall remain in effect and no separate concurrence from CDFW shall be required so long as the other public agency is carrying out or approving the Project as described by the Lead Agency Determination and the Request.



### Other Legal Obligations

The Project shall remain subject to all other applicable federal, state, and local laws and regulations, and this Concurrence shall not weaken or violate any applicable environmental or public health standards. (Pub. Resources Code, § 21080.56, subd. (f).)

### CDFW Director's Certification

By: 

Date: 6/6/2025

Charlton H. Bonham, Director  
California Department of Fish and Wildlife

**From:** Janet Yochmowitz <[JYochmowitz@yucca-valley.org](mailto:JYochmowitz@yucca-valley.org)>

**Sent:** Tuesday, April 15, 2025 05:17 PM

**To:** FGC <[FGC@fgc.ca.gov](mailto:FGC@fgc.ca.gov)>

**Subject:** Commission Meeting Wednesday, April 16, 2025, Item 14 Western Joshua Tree Conservation Plan

Dear Ms. Miller-Henson, Executive Director, Ms. Samantha Murray, President, Honorable Commissioners, and Mr. Charlton H. Bonham, CDFW Director,

Please see the attached public comments, provided by the Town of Yucca Valley for the April 16, 2025, Fish and Game Commission Meeting, Item 14 Western Joshua Tree Conservation Plan.

Kind regards,

Janet Yochmowitz

Town of Yucca Valley

Community Development/Planning Division

58928 Business Center Drive

Yucca Valley, CA 92284

760.369.1265 extension 310

***Office Days & Hours – Monday to Thursday, 7:30 am to 5:30 pm. The Office is closed from 12:00 pm to 1:00 pm.***

April 15, 2025

Samantha Murray, President  
California Fish and Game Commission  
715 P Street, 16<sup>th</sup> Floor  
Sacramento, CA 95814

**RE: DRAFT WESTERN JOSHUA TREE CONSERVATION PLAN**

President Murray and Members of the Commission:

The Town of Yucca Valley (the Town) appreciates the opportunity to provide comments on the Draft Western Joshua Tree Conservation Plan (WJTCP).

As the Draft WJTCP has been modified to indicate it is not designed or intended to create permitting standards and requirements, the Town requests the following.

That the Commission direct the Commission staff, as well as the Fish and Wildlife Director, to propose changes to the Western Joshua Tree Conservation Act to the Legislature and the Administration in the following areas.

**Exemptions for Existing Development**

Due to the density of the western Joshua tree (WJT) in the Town, basic maintenance functions are prohibitively expensive for property owners by the implementation of the WJTCA. These basic maintenance functions apply to existing residential, commercial, and industrial development. This category of exemption would apply only to existing developments that do not propose any enlargement or expansion of existing development:

- Replacement of septic systems and leach fields (see Appendix A).
- Replacement of utility lines, water, natural gas, electricity, cable, telephone, fiber optic, etc.
- Sewer connections (see Appendix A).
- Ground mount solar.
- Reconstruction/paving of parking lots.
- Replacement of fire/flood damaged/destroyed structures.

Planning  
(760) 369-6575  
Public Works  
(760) 369-6579  
Building and Safety  
(760) 365-0099  
Code Compliance  
(760) 369-6575  
Engineering  
(760) 369-6575  
Animal Control  
(760) 361-1807  
Animal Shelter  
(760) 365-3111  
FAX (60) 218-0084



The Town of  
**Yucca Valley**

COMMUNITY DEVELOPMENT/PUBLIC WORKS DEPARTMENT  
58928 Business Center Dr.  
Yucca Valley, California 92284

Maintenance of existing development should be classified as exempt from mitigation fees and ITP requirements.

### **Exemptions for the Maintenance of Existing Public Works Improvements**

The majority of street infrastructure within the Town has existed for forty to fifty years or more. Very few new streets have been constructed since the Town incorporated in November 1991. Utility companies have been installing, maintaining and replacing utilities in these streets for as long as 50 years. Maintenance of existing infrastructure and utilities should be classified as exempt from mitigation fees and ITP requirements. Below are examples of typical maintenance projects:

- Maintenance and repair of existing streets, slurry/cape seals, overlays, reconstruction, etc., but does not include any expansion beyond existing improvement limits.
- Maintenance, repair, and replacement of all utilities within the existing street limits. This does not include any expansion beyond existing improvement limits.
- Maintenance and repair of public park facilities.
- Maintenance and repair of public buildings and their supporting properties.

### **Exemptions for the State Mandated Wastewater Collection Program**

The California Regional Water Quality Control Board (RWQCB) is requiring the implementation of a sewer treatment system in Yucca Valley as part of an existing discharge prohibition order. Phase 2 of the sewer project includes the connections of homes that are located in areas with dense western Joshua trees. In some cases, connecting to the sewer will cost tens of thousands of dollars just in CDFW mitigation fees (see Appendix A), in addition to contract fees, permit fees, CEQA fees, biologist consultation fees, etc. As a disadvantaged community, homeowners in Yucca Valley, particularly in denser WJT habitat, will not be able to afford to connect to the sewer as well as afford the required mitigation fees. Exemption for lateral connections to the regional system would address this issue.

Appendix A includes an analysis prepared by MSA Consulting to assess the potential estimated mitigation fees associated for connecting 3 different single-family homes in Yucca Valley to the sewer. These estimates do not include the other mandatory related fees listed above (CEQA, biologist consultation, permit fees, etc.). The number of individual WJT within 50' of ground disturbance for each sewer lateral range from a low of 74 individual WJT to a high of 138 individual WJT. These estimates do not include WJT that are further than 50' from ground disturbance. The estimated mitigation fees range from \$46,700 to \$62,900 per single-family property. With the other associated fees listed above, it can be anticipated that the cost to obtain an ITP from CDFW will be extensive for each homeowner. According to the 2023 U.S. Census, the median household income in the Town is \$55,302 and the per capita income is \$32,643. The resulting financial strain would

be immense for these homeowners and not possible for some to pay. Installation of State mandated sewer connections should be classified as exempt from mitigation fees and ITP requirements.

### **Exemptions for Accessory Dwelling Units**

The development of accessory dwelling units (ADUs) implements State priorities and helps address the existing California housing shortage. Infrastructure already serves these residential properties. The WJTCA severely limits any new residential subdivision activity in the Town, as WJT density and local housing market will not support payment of mitigation fees to support new subdivision activity. As a result, development of ADUs is critical to meet the State's housing goals. Construction and maintenance of ADUs should be classified as exempt from mitigation fees and ITP requirements.

### **Exemptions for Infill Residential Development**

Infill development is already served by infrastructure including roads, flood control improvements, and utilities. Numerous properties were subdivided and served by infrastructure prior to the Town's incorporation. This includes the construction of new single-family and multi-family homes, as well as accessory dwelling units in accordance with State law. Construction and maintenance of infill single-family and multi-family dwelling units should be classified as exempt from mitigation fees and ITP requirements.

### **WJTCP Buffers**

A desert native plant specialist, as defined by the State, should determine the required buffer distance to avoid potential impacts to a WJT on a case-by-case basis consistent with previous direction from the California Department of Fish & Wildlife (CDFW).

### **Fire Hazards and WJT and Habitat Conservation**

Page 2-68 of the WJTCP briefly addresses the Local Responsibility Area for fire response and notes that there are opportunities for CDFW to collaborate with local fire departments on fire management strategies that benefit WJT on private property. The Town's wildlife urban interface abuts the Joshua Tree National Park. Recent fires in the State have put a microscope on what property owners can do to ensure their properties are maintained free of dry brush and dead vegetation without potentially affecting WJT habitat area in violation of the California Endangered Species Act (CESA)/Western Joshua Tree Conservation Act (WJTCA).

A defined distance for fire safety from existing structures would allow for an appropriate fire-safe buffer to be provided to homeowners. In the absence of such an exemption, homeowners will face difficulty in maintaining or obtaining property insurance. A property owner clearing dry brush and vegetation within WJT habitat should be eligible for a hazard management permit and should be exempt from mitigation fees and ITP requirements.



If you have any questions or require additional information, please contact me at 760-369-6579 Extension 305 or [sstueckle@yucca-valley.org](mailto:sstueckle@yucca-valley.org).

Best regards,

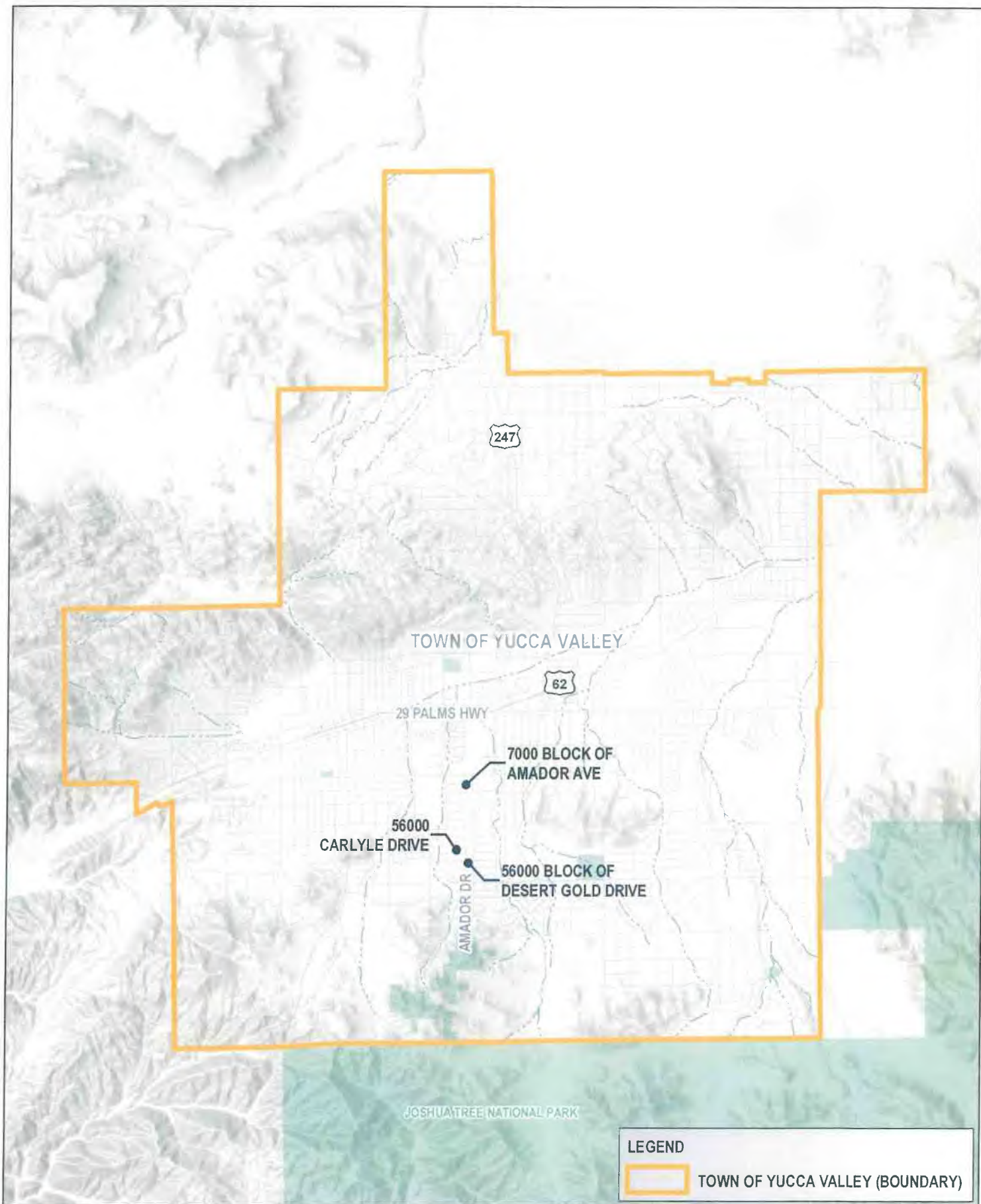
A handwritten signature in black ink, appearing to read 'S. Stueckle', enclosed within a large, loopy oval shape.

SHANE R. STUECKLE  
Deputy Town Manager

Attachment(s)

## **APPENDIX A**

### **Sewer Connection Analysis**



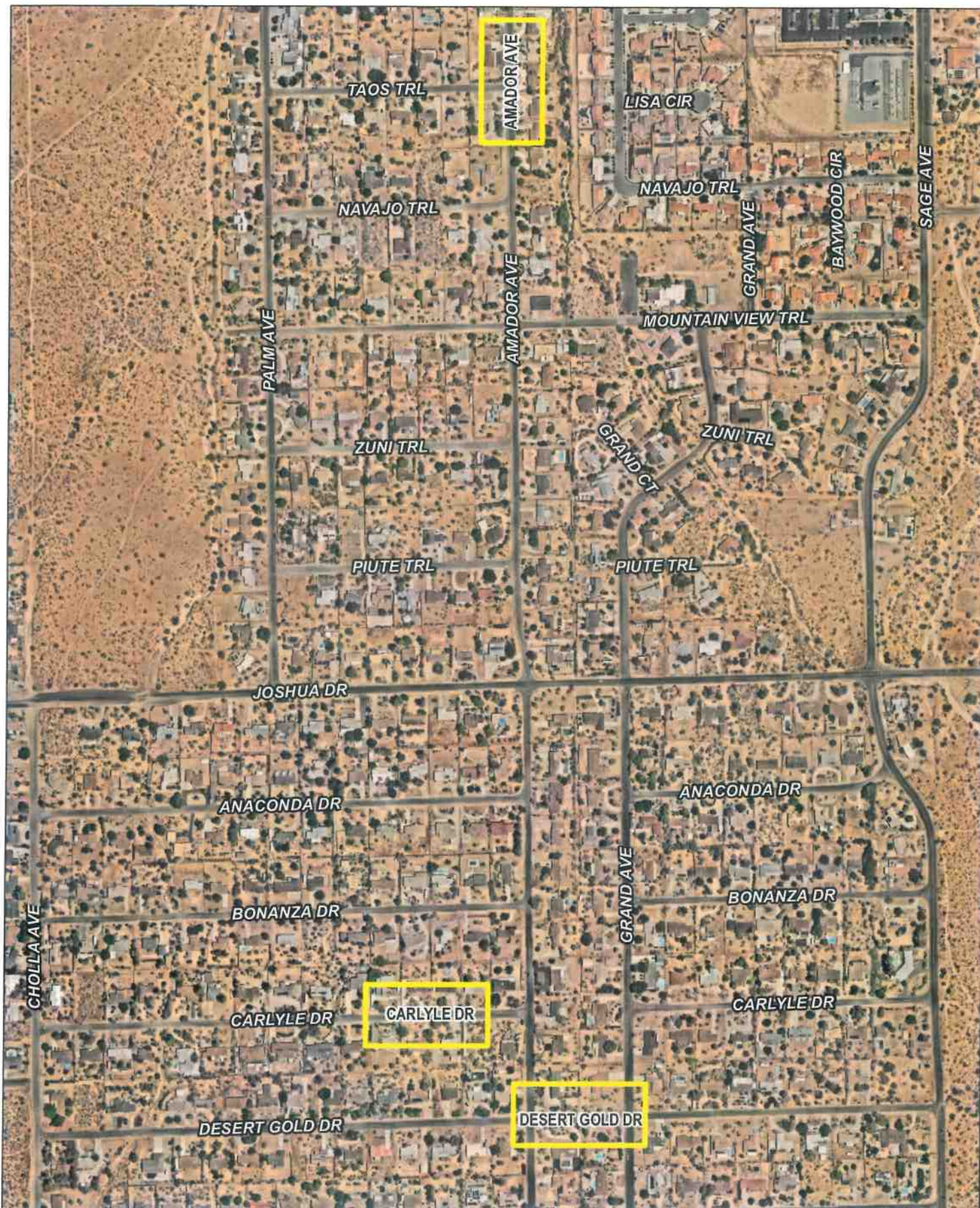
**MSA CONSULTING, INC.**

Civil Engineering • Land Surveying • Landscape Architecture  
Planning • Environmental Services • City Utility Coordination • GIS



## LOCATION MAP IN THE TOWN OF YUCCA VALLEY



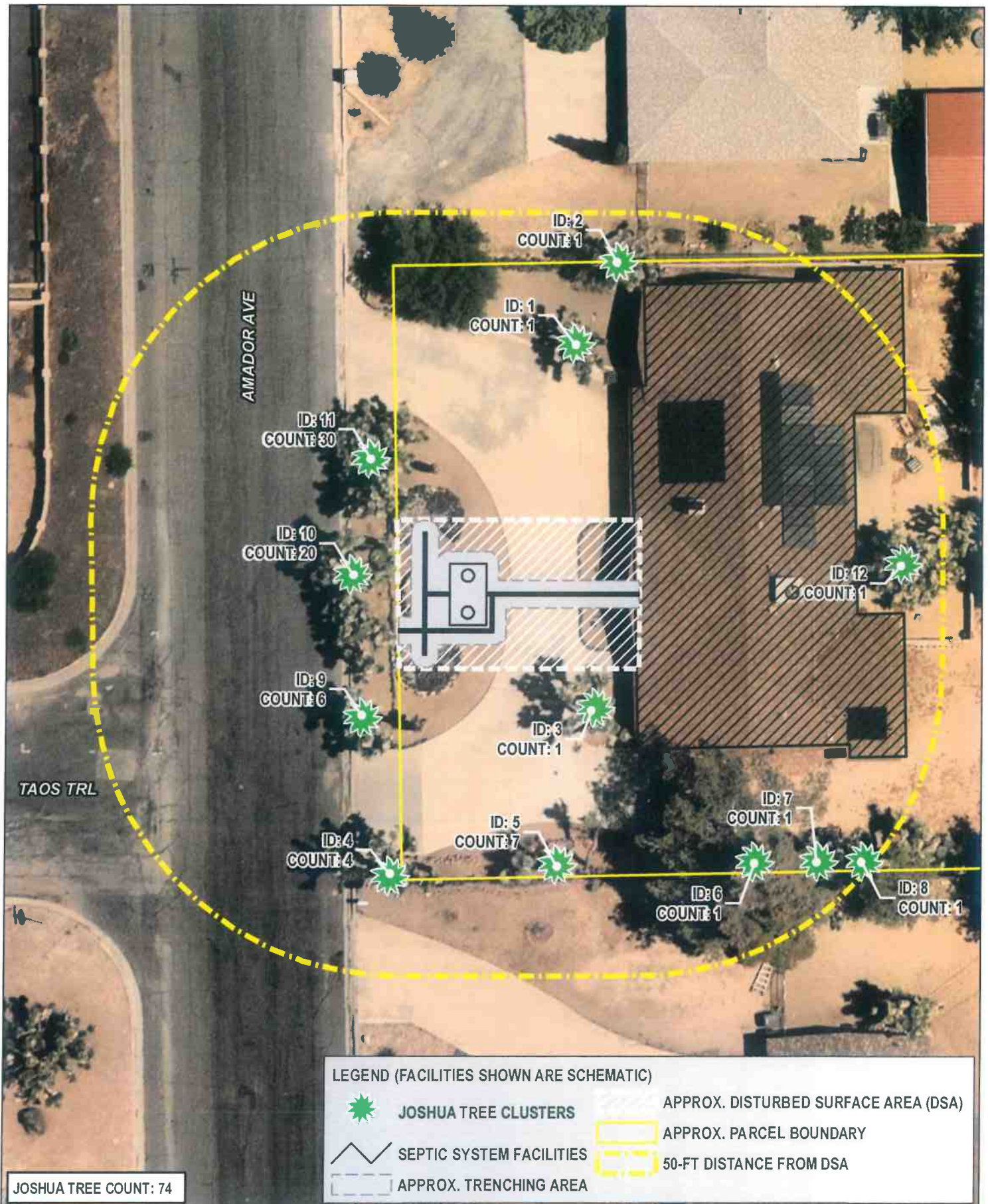


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**VICINITY MAP**  
IN THE TOWN OF YUCCA VALLEY





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 Planning • Environmental Services • Dry Utility Coordination • GIS



**7000 BLOCK OF AMADOR AVENUE**  
**JOSHUA TREE LOCATION ANALYSIS**



## 7000 Block of Amador Ave Joshua Tree Survey Photographs

### Contact Information

|                                 |                                 |
|---------------------------------|---------------------------------|
| Date                            | 1/28/2025                       |
| Times of Observation            | 10:00 AM                        |
| MSA Representative Name(s)      | Payton Thomas, Reed Witherspoon |
| MSA Representative Phone Number | (760) 320-9811                  |

### Observation Summary

Western Joshua tree (WJT) counts were estimated using the most recent Nearmap aerial views, dated 2023, and in-person surveys from the public right-of-way, performed in January 2025. The Amador Ave property included an estimated 74 individual WJT within the approximate area of disturbance (50-ft from approximate disturbed surface area). Individual WJT were observed to appear in approximately 8 clusters that were visible from the right-of-way, and 4 clusters that were obscured by fencing due to growth in the backyard of the property and only observable through Nearmap aerial views. Backyard cluster counts, Cluster ID 6, 7, 8, and 12, were standardized to counts of 1 individual per cluster. Of the 74 individual WJT, at least 7 individuals were estimated to be above 5 meters in height. In reference to the provided exhibit, these individuals were observed in Cluster ID 1, ID 2, ID 3, ID 4, ID 9, and ID 10.

The estimated fee amount to be issued by CDFW for an Incidental Take Permit for this property is around \$46,700. This fee was estimated using the approximate count and height of WJT through right-of-way photography.

### Cluster 1 and 2



Cluster 3 and 5



Cluster 4



Cluster 9-11





Cluster 11



Property View









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**56000 BLOCK OF CARLYLE DRIVE**  
**JOSHUA TREE LOCATION ANALYSIS**

## 56000 Block of Carlyle Dr Joshua Tree Survey Photographs

### Contact Information

|                                 |                                 |
|---------------------------------|---------------------------------|
| Date                            | 1/28/2025                       |
| Times of Observation            | 9:30 AM                         |
| MSA Representative Name(s)      | Payton Thomas, Reed Witherspoon |
| MSA Representative Phone Number | (760) 320-9811                  |

### Observation Summary

Western Joshua tree (WJT) counts were estimated using the most recent Nearmap aerial views, dated 2023, and in-person surveys from the public right-of-way, performed in January 2025. The Carlyle Dr property included an estimated 138 individual WJT within the approximate area of disturbance (50-ft from approximate disturbed surface area). Individual WJT were observed to appear in approximately 10 clusters that were visible from the right-of-way. Of the 138 individual WJT, at least 3 to 5 individuals were estimated to be above 5 meters in height. In reference to the provided exhibit, these individuals were observed in Cluster ID 3, ID 4, and ID 5. A separate species of Yucca was potentially observed in Cluster ID 6 which may exclude those counts from the total. Further analysis is required.

The estimated fee amount to be issued by CDFW for an Incidental Take Permit for this property is around \$62,900. This fee was estimated using the approximate count and height of WJT through right-of-way photography.

### Cluster 1, 2, and 3







Cluster 4



Cluster 5, 6 (potentially not western joshua trees), 7, and 10





Cluster 6 (potentially not western joshua tree)



Cluster 5 and 9



## Cluster 10



Property view (from left)









# 56000 Block of Desert Gold Dr Joshua Tree Survey Photographs

| Contact Information             |                                 |
|---------------------------------|---------------------------------|
| Date                            | 1/28/2025                       |
| Times of Observation            | 9:00 AM                         |
| MSA Representative Name(s)      | Payton Thomas, Reed Witherspoon |
| MSA Representative Phone Number | (760) 320-9811                  |

## Observation Summary

Western Joshua tree (WJT) counts were estimated using the most recent Nearmap aerial views, dated 2023, and in-person surveys from the public right-of-way, performed in January 2025. The Desert Gold Dr property included an estimated 112 individual WJT within the approximate area of disturbance (50-ft from approximate disturbed surface area). Individual WJT were observed to appear in approximately 11 clusters that were visible from the right-of-way. Of the 112 individual WJT, at least 5 individuals were estimated to be above 5 meters in height. In reference to the provided exhibit, these individuals were observed in Cluster ID 1, ID 2, ID 6, ID 10, and ID 11. Cluster ID 1 and ID 11 were observed from arial photographs to grow both inside and outside of the area of disturbance. Due to homeowner privacy concerns, counts were not able to be obtained distinguishing between the two. Counts for these two clusters include total individual WJT observed in the cluster regardless of placement in the disturbance boundaries.

The estimated fee amount to be issued by CDFW for an Incidental Take Permit for this property is around \$59,200. This fee was estimated using the approximate count and height of WJT through right-of-way photography.

### Cluster 1



Cluster 2



Cluster 4





Cluster 5 and 6



Cluster 7 and 8



Cluster 9 and 10



Cluster 11



Full Property



April 24, 2025

via email: fgc@fgc.ca.gov

California Fish and Game Commission  
And  
Charlton Bonham, Director  
P.O. Box 944209  
Sacramento, CA 94244-2090

**Subject: Western Joshua Tree Conservation Plan Comments**

Honorable Commissioners and Director Bonham:

Due to the zoom issues at the last public hearing, I was not able to provide verbal public comments on the Western Joshua Tree Conservation Plan. Therefore, I am providing an expanded version.

### **Permitting**

First, I deeply appreciate the time staff has spent with me to discuss my permitting concerns of this plan. I find it interesting that the Commission members did not want to acknowledge that Permitting is part of the Plan. The permitting is actually the thing that separates the Plan from just a “conservation plan” and is the main issue with the “conservation plan.”

I also appreciate the Staff’s attempt to reduce the mitigation buffers as part of the requirements, and study the tolerance the species has in the urban environment. This does not go far enough. Even after the meeting, I am still hearing from homeowners that buffers are being applied for mitigation. So, I don’t know if the staff has gotten the memo yet.

The permitting portion of the Plan oversteps the only definition that is supposed to apply to permitting - “take” or “KILL.” There is no way under CESA to “hunt, pursue, catch, or capture,” or attempt to do so, to a stationary object. The “hunt, pursue, catch or capture” generally refers to a mobile species in which those actions cause emotional distress that could threatened its existence. That leaves the only portion of the definition applicable to this species, which is “kill.” How does one “kill” the western Joshua tree? Relocation does not kill a western Joshua tree. Severing roots 5 feet away for the purpose of relocation does not “kill” the western Joshua tree, so how is it that a project being implemented within 25 feet or 50 feet actually “kills” the tree? Until the CDFW knows that answer, there should be no mitigation for “root encroachment” in any sort of buffer. The only definition that needs to be applied is to “kill” which is removing the tree and not relocating it – the tree is lost forever.

Additionally, the Act specifically states, the census should be performed ON the project site. Right now, the buffers represent off the project site for “assumed kill.” And we all know what assumed means. An example of this disconnect, is how can you sever a root 5 feet from the tree to relocate



the tree and it lives, but there is an “assumed” take – kill - if you are merely working around or trenching near a root that is potentially 25 feet or 50 feet away? Everyone in the urban area with these trees knows exactly how to work around them, which is the same as minimization and avoidance. If there is no actual “kill,” there should be no mitigation.

Additionally, why are relocated trees charged under the mitigation schedule? If relocation “killed” the tree, then why would relocation be a required part of the Act? Relocation is not “kill” or it would not be an option as part of the Conservation Act. As I have stated before, I do believe there is some latitude in the Act to charge a small fee for the relocated tree, so CDFW can still get their money, but not at the “kill” rates to be charged.

Therefore, if you are only charging mitigation fees for those trees that are actually removed and not relocated, (“killed”), and only a minor “administrative” type fee for those trees that are relocated, you are staying within the intent Act – which was conservation – I believe that would greatly relieve the burden for everyone.

As an example, a single family homeowner wants to build a house or structure on his property where there are eight trees that are in the way of the structure. He proposes to relocate all eight on his property. Technically, that is not “kill.” Therefore, no mitigation fees would be charged. He still has significant expense though because he has to create a relocation plan, hire biologists, specialists – and until the CEQA compliance is resolved – pay fees for a detailed environmental document, planning director process... all that are not warranted for this kind of project except to satisfy CEQA solely for the CDFW. So the homeowner is still financially damaged by the Act, just not by the permitting portion of the Act.

CESA is very strict on permitting. At the previous commission meeting, we heard “we have never done this before” – was that supposed to mean it’s threatened, but it’s not threatened? We want to do something, but not do something too harsh? Conservation is great but treating this species as threatened under CESA has been proven not to be warranted by three independent studies to determine candidacy under CESA and the federal ESA. It was clear at the last Commission meeting that the Commissioners wanted to stay focused on conservation. Therefore, staff absolutely has the latitude to use common sense when approaching the permitting for this species.

### **California Environmental Quality Act Compliance**

I appreciate the Director’s willingness to prepare an EIR for this. But as one homeowner stated which applies to many, they are on the clock. Homeowners and small developers already have construction loans, the infill developers have investors, they all are paying property taxes, interest, etc. An EIR can take at least 18 months. Many of the agencies, homeowners and small developers have already been waiting for the past two years. They really can’t afford to wait another two years for an EIR.

Additionally, while a CEQA EIR is not required to directly address the socioeconomic impacts of the Act, it absolutely should be addressed under the Population and Housing criteria in order to justify the buffers and fees of the permitting and the hardships that it is causing on residents, homeowners, utilities, etc. Therefore, the CDFW must conduct this analysis and prepare a Statement of Overriding Considerations that the threatened existence of this tree outweighs the harmful permitting practices

and fees. Given that there are three studies that say the tree should not be treated as threatened under CESA or federal ESA, I do not believe the CDFW can make that finding. Additionally, the EIR opens the CDFW and the Commission to a lawsuit, which could tie it up even longer.

The easiest thing to do would be for your legal counsel to make a finding that permits issued under the Western Joshua Tree Conservation Act are completely different and are **not permits under CESA**. There is no provision in CESA for the Western Joshua Tree Conservation Act. However, the Western Joshua Tree Conservation Act clearly states that a permit can be issued under CESA **OR** the Act. So clearly, there was some intent in the Act to treat this species differently when it comes to permitting.

As the Commission and the Director has said multiple times – “we are doing something that has never been done before.” So treat it as just that – different. Treat these permits as you would a Lake and Streambed Alteration Permit, it is just a permit. That way, the CEQA authority falls back to the Lead Agency. For a single family home that does not require CEQA, the Lead Agency could file a Notice of Exemption for a Ministerial Action, or “In Fill.” That way the CDFW has a CEQA document and the homeowners and small developers are not overburdened by the permitting process for a full CEQA Initial Study.

Therefore, to ease the burden on projects immediately, I respectfully suggest: 1) remove these assumed buffers until they can be proven to “kill” the species, 2) mitigation fees for only kill - meaning removing a tree and not relocating it; and 3) remand CEQA back to the discretion of the Lead Agency and allow for CEQA Exemptions. In essence – **use common sense**.

I understand that the homeowners in Yucca Valley have reached out to the Director and requested that he visit with them. I know he understands the issues, but I recommend that before the Commission takes any action to finalize this Plan, that the CDFW Director and the Commissioners visit the communities where the WJT has been protected and is prolific in the built environment, such as Yucca Valley, Landers, Flamingo Heights, Phelan, Hesperia, etc.

I believe it is important to preserve the WJT without causing an unnecessary burden on critical infrastructure and the disadvantaged and severely disadvantaged communities that live in the WJT habitat area. Thank you for your consideration. Please feel free to contact me at (909) 496-5960 if you have any questions or need more information.

Sincerely,

A handwritten signature in cursive script that reads "Julie A. Gilbert". The signature is written in dark ink and is positioned above the printed name and title.

Julie A. Gilbert  
President

# REED FAMILY COMPANIES

CARING FOR OUR PEOPLE, CUSTOMERS, COMMUNITIES, AND ENVIRONMENT



May 7, 2025

**President Erika Zavaleta and Director Charlton Bonham**

California Fish and Game Commission

715 P Street, 16th Floor

Sacramento, CA 95814

**Subject: Concerns Regarding the Western Joshua Tree Conservation Plan**

Dear President Miller and Director Bonham,

I am writing on behalf of Reed Family Companies (RFC) to express our concerns regarding the Western Joshua Tree Conservation Plan (Plan) and its potential impact on our operations. While we fully support the conservation of the Western Joshua Tree (WJT), we believe that certain aspects of the Plan require reconsideration to balance environmental protection with economic viability.

## **Inclusion of SMARA Reclamation as Avoidance and Minimization**

We strongly urge the Commission to recognize the reclamation of surface mining operations under the Surface Mining and Reclamation Act (SMARA) as a valid method of achieving avoidance and minimization. Reclamation plans often include the restoration of native habitats and plants, which aligns with the conservation goals of the Plan. By making the WJT part of the reclamation plan, you ensure the site returns back to the original WJT habitat. Incorporating SMARA reclamation into avoidance and minimization strategies will ensure that mining operations contribute positively to the conservation of the Western Joshua tree while continuing to operate sustainably.

## **Impact of Mitigation Fees on Mining Operations**

The mitigation fees outlined in the Plan pose a significant financial burden on our ability to mine our vested property. These fees, calculated based on the number and size class of the trees taken, could severely impact our economic viability and hinder our ability to access reserves. Additionally, there is a disparity in the fees being assessed between the unbounded region our Canebrake quarry is located within and the fees assessed south of us in the bounded region. We see no scientific justification or principle that would require us to pay such exorbitantly higher fees than our southern counterparts. In short, it is unfair to assess these higher fees.

### **AB 1008 Requirements:**

| Tree Size | Bounded Lower Fee Area (per tree) | Unbounded Higher Fee Areas |
|-----------|-----------------------------------|----------------------------|
| >5 Meters | \$1000                            | \$2500                     |
| <5 Meters | \$300                             | \$500                      |

Not being able to mine aggregate locally would result in a significant increase in greenhouse gas emissions, as aggregate would need to be trucked into the region. Given that global warming is the leading threat to the WJT, this outcome seems counterproductive to the conservation goals of the Act. We request that the Commission consider alternative mitigation measures that do not disproportionately affect the mining industry.

### **Incidental Take Permits for Relocation within Avoidance Buffers**

We also believe that incidental take permits should not be required when relocating a WJT within the avoidance buffer of another tree. It is clearly observable that WJTs thrive in areas where they are densely populated. Relocating trees within these buffers is a practical and effective method of minimizing impacts while ensuring the survival of the trees. Requiring incidental take permits for such relocations adds unnecessary complexity and delays to the process. We propose that the Commission streamline the permitting process for relocations within avoidance buffers to facilitate adaptive management and conservation efforts.

### **Opposition to Listing the Western Joshua Tree under California's Threatened and Endangered Species List**

We strongly oppose the listing of the WJT under California's Threatened and Endangered Species List. The California Department of Fish and Wildlife (CDFW) conducted a comprehensive study and did not recommend the species for listing. The Western Joshua Tree Conservation Act was created to avoid the need for listing this species by implementing conservation measures. Listing the WJT as threatened or endangered would impose additional regulatory burdens and could hinder economic development without providing significant additional conservation benefits.

In conclusion, we respectfully request that the Commission consider these points and make the necessary adjustments to the Plan. By doing so, we can achieve a balanced approach that protects the WJT while supporting the economic development of our industry.

Thank you for your attention to these matters. We look forward to working collaboratively with the Commission to find solutions that benefit both conservation and economic interests.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ian Davies', with a stylized, flowing script.

**Ian Davies**  
**Environmental Manager**  
**Reed Family Companies**



May 29, 2025

Erika Zavaleta  
President  
California Fish and Game Commission  
715 P Street, 16<sup>th</sup> Floor  
Sacramento, CA 95814

RE: CalCIMA Comments WJTCP June 2025 Commission Meeting

Dear President Zavaleta and Members of the Fish and Game Commission,

CalCIMA appreciates the opportunity to provide this consolidated feedback on the Draft Western Joshua Tree Conservation Plan (Plan). This letter references our four previous submissions, which collectively underscore the importance of preserving the iconic Western Joshua Tree while balancing California's economic and infrastructure development needs. The western Joshua Tree is a species that currently occupies 1.8 million acres of ecologically core and ecologically intact habitat, equal to 25% of the total developed acreage of humans in California and number between 3 and 9 million. The public deserves a carefully crafted policy to ensure we do not overtax critical minerals for renewable and other clean energy and essential infrastructure development while adapting to climate change.

Across our prior comments, we have highlighted critical concerns with the Plan's current form, including its incompleteness, the absence of clear, measurable conservation objectives, and the unrealistic scope of proposed land acquisitions—over 479,000 acres by 2033. We had hoped to update such figures through review of a complete plan, but such a plan has yet to be provided despite the fact comments on the plan closes today, May 29, 2025, just two weeks before the commission is slated to act.

We have not received confirmation that the amendments we submitted in our comments dated May 08, 2025, have been implemented. We further haven't seen to what extent our other concerns with the incomplete plan or concepts for improvement have or have not been implemented. While homeowners have appropriately been treated to a relocation exemption in the updated relocation guidelines published yesterday, the scientific justification for such has not been included for others to benefit from as well. Perhaps it is in the plan.

Our key recommendations, detailed in our earlier letters, urge the Commission and California Department of Fish and Wildlife (CDFW) to:

**WWW.CALCIMA.ORG**

455 Capitol Mall, Ste. 210 | Sacramento, CA 95814 | (916) 554-1000  
3890 Orange Street, Suite 167 | Riverside, CA 92501 | (951) 941-7981



- Define clear, measurable conservation targets aligned with the legislature's directive to maintain the species' status without requiring endangered listing.
- Ground land conservation goals in sound ecological and economic data, ensuring realistic, achievable outcomes.
- Leverage existing public lands and conservation frameworks to focus efforts efficiently.
- Provide transparent, detailed information on funding, staffing, and permitting processes necessary to support Plan implementation.

The Western Joshua Tree Conservation Act reflects a balanced legislative intent—to conserve this resilient species while allowing for responsible economic growth. It is imperative that the Conservation Plan reflects this balance through clarity, completeness, and practical implementation strategies. We encourage commissioners to review and incorporate into the plan the four amendments CalCIMA suggested if the Department did not, they.

1. Clarify the distinction between the Plan and the permitting process.
2. Address avoidance and minimization for previously entitled homes and infrastructure.
3. Introduce an avoidance and minimization framework for mineral development.
4. Introduce an avoidance and minimization Safe Harbor for relocated and preserved trees.

We respectfully urge the Commission to ensure the Plan is fully developed, financially and operationally supported, and transparent before final adoption. CalCIMA remains committed to constructive collaboration to achieve a conservation strategy that protects California's natural heritage and supports its communities. We have attached our May 08, 2025, letter for reference.

Thank you for your consideration.

Respectfully,



Adam Harper  
Senior Director of Policy  
California Construction and Industrial Materials Association



May 08, 2025

Erika Zavaleta  
President  
California Fish and Game Commission  
715 P Street, 16<sup>th</sup> Floor  
Sacramento, CA 95814

Charlton "Chuck" Bonham  
Director,  
California Department of Fish and Wildlife  
715 P Street  
Sacramento, CA 95814

RE: CALCIMA Suggested Amendments WJTCP May 2025

Dear President Zavaleta and Director Bonham,

CalCIMA appreciates the opportunity to continue providing input on the Draft Western Joshua Tree Conservation Plan (Plan) to the California Fish and Game Commission (Commission). Respecting the urgency of the Commission's timeline, we have developed focused amendment proposals that offer immediate clarity while establishing a foundation for future iterations of the Plan.

It is critical that we work collaboratively to realize the dual objectives of the Plan and the Western Joshua Tree Conservation Act. This vision was aptly captured by Assemblymember Juan Carrillo during the Assembly Floor discussion of SB 122:

*"This bill is not just about preservation of a remarkable species, it is a testament to the ability to strike a delicate balance between safeguarding our natural heritage and providing a pathway for the much needed economic development that our district yearns for."*

**WWW.CALCIMA.ORG**

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Recognizing the time limitations and the breadth of unresolved questions, we respectfully submit four targeted amendments for your consideration:

1. Clarify the distinction between the Plan and the permitting process
2. Address avoidance and minimization for previously entitled homes and infrastructure
3. Introduce a avoidance and minimization framework for mineral development
4. Introduce a avoidance and minimization Safe Harbor for relocated and preserved trees

### **Amendment 1: Add Background on Permitting (Section 1.1.3)**

The Department correctly notes that many Plan discussions have focused on permitting. To provide clarity and assist future users of the Plan, CalCIMA proposes the addition of a concise, high-level permitting background in a new Section 1.1.3. The proposed language, attached as **CalCIMA Suggested Amendment 1 – Permitting**, references both statute and the Department's website, and is intended to orient stakeholders needing permits to the proper locations and inform future dialogue on the Plan.

### **Amendment 2: Clarify Status of Existing Homes and Previously Entitled Projects**

Much of the public testimony has centered on existing homes, infrastructure, and development projects that predate the Act. These entities, often conditioned under prior regulatory regimes such as the California Native Plant Act, face unique challenges with respect to avoidance and minimization requirements.

We propose that the Plan explicitly recognize these projects as having met their avoidance and minimization obligations under previously applicable laws, thereby leaving mitigation as the primary remaining requirement. To this end, we request the following addition to Section 5.2.1 ("Impact Avoidance and Minimization"):

"The first priority for conservation of western Joshua tree and its habitat is to avoid adverse [climate](#) impacts altogether. Although climate change stress may be impossible to avoid in the short-term, other impacts are avoidable, such as project-related degradation and destruction of habitat. [However, it should be recognized that existing homes, and public and private development projects, do not have the same avoidance and minimization opportunities as new projects brought forward after the Act's adoption. Further as identified previously in this plan, such existing homes and projects may have had avoidance and minimization measures imposed under prior laws \(e.g. California Native Plant Act\). Such existing projects and essential infrastructure authorized prior to the Act's adoption are recognized as achieving their avoidance and minimization obligations by virtue of meeting their adopted obligations at the time of project approval, authorization or legislative creation. For new projects,](#) Impact avoidance should be emphasized as the first preferred choice whenever feasible, especially in areas identified as climate refugia. Furthermore, the importance of avoiding take to western Joshua tree and its habitat has been emphasized during discussions with Tribes, in

particular the principle of not harming a tree unless it is absolutely critical for people (FIICPI, pers comm., 2024b).”

The language is attached as **CalCIMA Amendment 2 – Pre-Existing Projects**.

### **Amendment 3: Add Management Action 1.6 – Avoid Impacts from Mineral Development**

The Plan should from the outset encourage mining operations to proactively support western Joshua tree conservation through reclamation efforts. Specifically, where mining reclamation plans under SMARA include western Joshua tree planting or relocation, such actions should be recognized as avoidance and minimization measures.

While not all mines will pursue this approach—due to differing end uses based on community and landowner needs those that do should be supported and encouraged. The proposed language, attached as **CalCIMA Amendment 3 – Mineral development**, reads as follows:

#### **“Action A&M 1.6: Avoid Impacts from Mineral Development**

Reclamation of surface mining operations under the Surface Mining and Reclamation Act (SMARA) is recognized as achieving minimization and avoidance where the reclamation plan includes a revegetation plan addressing western Joshua trees, including without limitation, planting and/or relocation of western Joshua trees. “

### **Amendment 4 – Avoidance and Minimization Safe Harbor for Relocated and Preserved Trees**

Current statutory protections around relocation are inadequate and may unintentionally disincentivize preservation. As multiple witnesses testified, project proponents and homeowners are discouraged from maintaining relocated trees due to long-term economic burdens and the costs of recurring potential impacts.

There is an urgent need to create provisions that protect those who choose to preserve relocated trees, either on- or off-site, from future regulatory liability as well as other preserved trees on the site. Without such a mechanism, we risk incentivizing “take” over relocation—a perverse outcome that undermines the conservation goals of the Act.

This proposal, CalCIMA Suggested Amendment 4 – Relocated and Preserved Trees, aims to encourage tree preservation by removing the regulatory and financial disincentives currently in place to maintaining trees on site. The language is attached as **CalCIMA Amendment 4 – Relocated and Preserved Trees**.

In conclusion, CalCIMA believes that addressing these four key areas in the initial Plan is essential to:

- Provide necessary background for permitting,
- Establish clarity around the legal transition between prior and current requirements,
- Promote habitat restoration by mineral developers, and
- Create a Safe Harbor for Relocated and Preserved Trees.

We appreciate your consideration of these amendments and look forward to continued collaboration and discussion.

Respectfully,



Adam Harper  
Senior Director of Policy  
CalCIMA



CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

# Western Joshua Tree Conservation Plan



[CalCIMA Suggested Amendment 1: Add Introduction Addition 1.1.3: Background of the Western Joshua Tree Conservation Act – Permitting](#)

VOLUME I: WESTERN JOSHUA TREE CONSERVATION PLAN

**Draft Presented to the  
California Fish and Game Commission**

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### 1.1.2 Background of the Western Joshua Tree Conservation Act

In October 2019, the Center for Biological Diversity submitted to the Commission a petition to list western Joshua tree as threatened under CESA. The petition identified climate change and wildland fires as the greatest threats to the persistence of the species. It also included habitat loss due to development; seed and plant predation, especially during drought; and competition with invasive species as other factors affecting the species' ability to survive and reproduce (Center for Biological Diversity 2019).

The Commission found, based in part on CDFW's evaluation of the petition and related recommendation, that there was sufficient information indicating that listing the species as threatened under CESA may be warranted. The Commission designated western Joshua tree a candidate species in September 2020 (CDFW 2022), conferring upon western Joshua tree temporary legal protection under CESA.

CDFW evaluated the petition and submitted a written status review report to the Commission in March 2022 (CDFW 2022). The report concluded that western Joshua tree is not likely to be in danger of becoming extinct throughout all, or a significant portion, of its range in the foreseeable future in the absence of special protection and management efforts required by CESA. In June 2022, the Commission considered the status review report and could not reach a decision regarding whether listing the species as threatened was warranted. In February 2023, while the Commission was still considering its final decision on the petition, legislation was introduced to protect western Joshua tree. In response to the legislative proposal, the Commission postponed further consideration of the petition under CESA.



Source: National Park Service.



In July 2023, the California State Legislature passed and the governor signed into law WJTCA, codifying as Chapter 11.5 of Division 2 of the California Fish and Game Code (commencing with Fish & G. Code, § 1927). WJTCA does the following:

- Provides protections for western Joshua tree by prohibiting the import, export, take, possession, purchase, or sale of any western Joshua tree in California (Fish & G. Code, § 1927.2, subd. (a)). Pursuant to Fish and Game Code Section 86, “take” means “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.”
- Allows CDFW to authorize take of western Joshua tree if certain conditions are met (Fish & G. Code, § 1927.3, subds. (a)-(b)).
- Authorizes CDFW to enter into a written agreement with any county or city to delegate to the county or city limited authority to authorize take of western Joshua tree if specified conditions are met (Fish & G. Code, § 1927.3, subd. (c)).
- Allows CDFW to authorize, by issuing permits, the removal or trimming of dead western Joshua trees or the trimming of live western Joshua trees that pose a risk to structures or public health and safety if certain conditions are met. (Fish & G. Code, § 1927.4, subd. (a)).
- Authorizes CDFW to enter into a written agreement with any county or city to delegate to the county or city limited authority to authorize the removal or trimming of dead western Joshua trees or the trimming of live western Joshua trees that pose a risk to structures or public health and safety if specified conditions are met (Fish & G. Code, § 1927.4, subd. (b)-(c)).
- Allows permittees to elect to pay specified fees in lieu of completing mitigation obligations (Fish & G. Code, § 1927.3, subd. (a)(3)).
- Establishes the Western Joshua Tree Conservation Fund (Conservation Fund). Any monies in the fund will be continuously appropriated to CDFW solely for the purposes of acquiring, conserving, and managing conservation lands and completing other activities to conserve western Joshua tree. (Fish & G. Code, § 1927.5, subd. (a)).
- Directs CDFW to develop and implement a conservation plan for western Joshua tree in collaboration with the Commission, other governmental agencies, California Native American tribes, and the public. (Fish & G. Code, § 1927.6, subd. (a)). CDFW must consult with California Native American tribes and include co-management principles (Fish & G. Code, § 1927.6, subd. (b)). CDFW must present the draft Conservation Plan at a public meeting of the Commission no later than December 31, 2024, and WJTCA calls for the Commission to take final action on the plan by June 30, 2025. (Fish & G. Code, § 1927.6, subd. (a)).
- Directs CDFW to submit an annual report assessing the conservation status of western





Joshua tree to the Commission and the State Legislature by January 31 of each year, starting in 2025 (Fish & G. Code, § 1927.7, subd. (a)).

- Requires CDFW to submit to the Commission an updated status review report by January 1, 2033, unless the Commission directs CDFW to complete it sooner (Fish & G. Code, § 1927.2, subd. (c)(2)(F) & 1927.9). The Commission shall consider determining whether the petitioned action to list western Joshua tree under CESA is warranted (Fish & G. Code, § 1927.9). In the interim, western Joshua tree is, and will remain, a candidate species under CESA.

### **1.1.3 Background of the Western Joshua Tree Conservation Act – Permitting**

The Western Joshua Tree Conservation Act created an in-lieu fee Permitting system for homeowners and businesses taking western Joshua Tree's in California. The Act has a dual mission of enabling development and providing for conservation of the western Joshua Tree. The Act's provisions are separate from the conservation plan but provide important legislative direction for the plan to establish conservation tools and policies. In addition, the legislature enabled local governments to have the authority to grant western Joshua Tree Incidental Take permits for single-family residences, multifamily residences, accessory structures, and public works projects concurrent with providing project approvals.

In establishing this Direction, the legislature defined the permitting criteria developers and homeowners taking western Joshua Tree would need to meet in Fish and Game Code Subsection 1927.3 (a)(1)-(4):

“(a) The department may authorize, by permit, the taking of a western Joshua tree if all of the following conditions are met:

(1) The permittee submits to the department for its approval a census of all western Joshua trees on the project site, including size information and photographs, that categorize the western Joshua trees according to the following size classes:

(A) Less than one meter in height.

(B) One meter or greater but less than five meters in height.

(C) Five meters or greater in height.

(2) The permittee avoids and minimizes impacts to, and the taking of, the western Joshua tree to the maximum extent practicable. Minimization may include trimming, encroachment on root systems, relocation, or other actions that result in detrimental but nonlethal impacts to a western Joshua tree.

(3) The permittee mitigates all impacts to, and taking of, the western Joshua tree. The measures required to meet this obligation shall be roughly proportional in extent to the impact of the authorized taking of the species. When various measures are available to meet this obligation, the measures required shall maintain the permittee's objectives to the greatest extent possible. All required measures shall be capable of successful implementation. The permittee shall ensure adequate funding to implement the mitigation measures. In lieu of completing the mitigation obligation on its own, the permittee may elect to satisfy this mitigation obligation by paying fees, pursuant to the fee schedule in subdivision (d) or (e), for deposit into the fund.



(4) (A) The department may include permit conditions that require the permittee to relocate one or more of the western Joshua trees. If relocation is required, the permittee shall implement measures to assist the survival of relocated trees, and to comply with any other reasonable measures required by the department to facilitate the successful relocation and survival of the western Joshua trees. These relocation measures shall include, but are not limited to, all of the following:

- (i) A requirement that the relocated western Joshua tree is placed in a location and with proper orientation to improve its survival.
- (ii) A requirement that western Joshua trees are relocated at a time that maximizes their survival when feasible.
- (iii) A requirement that a desert native plant specialist be onsite to oversee relocation."

The Department Maintains a permitting website available at the following location (<https://wildlife.ca.gov/Conservation/Environmental-Review/WJT/Permitting/WJTCA-ITP>). Members of the public interested in applying for permits can find the necessary documents and forms at this website.

## 1.2 CONSERVATION PLAN VISION, PURPOSE, AND OBJECTIVES

### 1.2.2 Vision

The vision of the Conservation Plan is to prevent the extinction of western Joshua tree in the wild, preserve functioning ecosystems that support western Joshua tree, and maintain sustainable populations of western Joshua tree in California over the long term, such that listing the species under CESA will not be warranted.

### 1.2.3 Purpose

The purpose of the Conservation Plan is to fulfill the requirements articulated in Fish and Game Code Section 1927.6. Upon approval by the Commission, the Conservation Plan will guide the conservation of western Joshua tree in California by focusing on the most urgent and important management actions, as informed by science including TEK; collaboration with California Native American tribes; collaboration with federal, state, and local government agencies; and public feedback.

### 1.2.4 Objectives

The following objectives are identified in WJTCA:

- Describe management actions necessary to conserve western Joshua tree and objective, measurable criteria to assess the effectiveness of such actions (Fish & G. Code, §1927.6, subd. (a)).





- Provide guidance for the avoidance and minimization of impacts to western Joshua trees (Fish & G. Code, § 1927.6, subd. (a)).
- Include in the Conservation Plan protocols for the successful relocation of western Joshua trees and provide for the relocation of western Joshua trees to tribal lands upon a request from a Tribe (Fish & G. Code, § 1927.6, subds. (a)-(b)).
- Include co-management principles and incorporate Traditional Ecological Knowledge into the Conservation Plan (Fish & G. Code, § 1927.6, subd. (b)).
- Prioritize actions and acquiring and managing lands that are identified as appropriate for western Joshua tree conservation (Fish & G. Code, § 1927.6, subd. (c)).

### 1.2.5 Geographic Focus Area

The Conservation Plan includes a geographic focus area for conservation activities encompassing 37,749 square kilometers (9,327,981 acres, or 14,575 square miles) in southeastern California. It reflects the general location of currently occupied western Joshua tree habitat plus an 8-kilometer (5-mile) buffer in California to encompass areas that could be suitable for implementation of conservation management actions (Figure 1-2). However, application of WJTCA and implementation of the management actions described in the Conservation Plan (see Chapter 5, “Conservation Management Actions and Effectiveness Criteria”) are not limited to the geographic focus area. In addition, the geographic focus area may be modified through amendment of this Conservation Plan based on evolving information regarding current and future western Joshua tree habitat resulting from ongoing scientific analysis.



CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

# Western Joshua Tree Conservation Plan

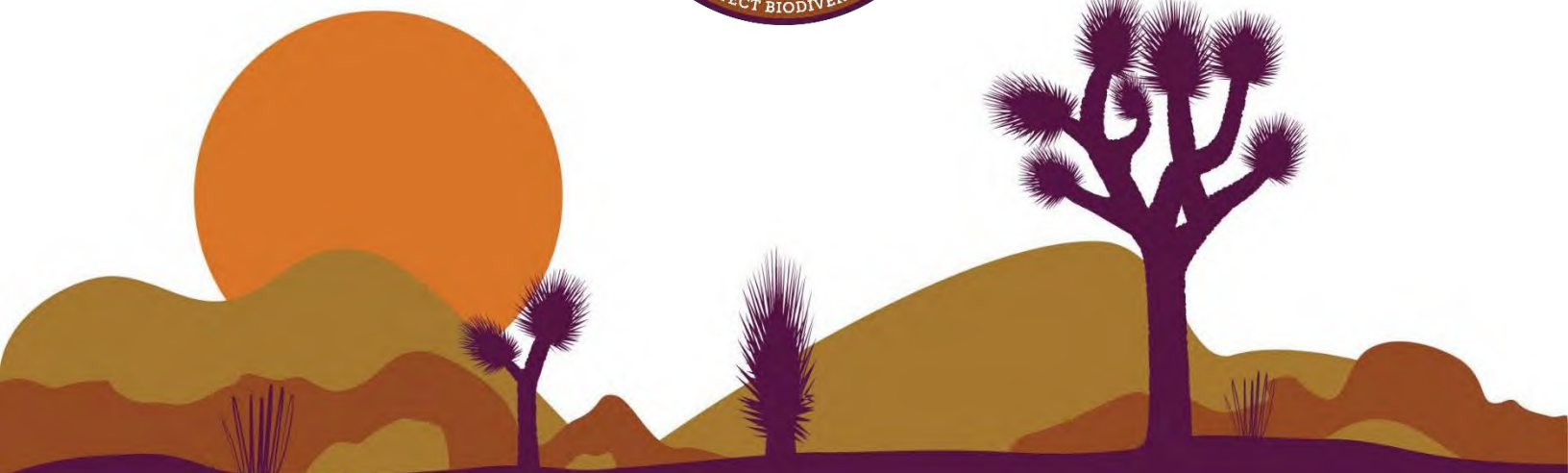


**CalCIMA Suggested Amendment 2:** – Impact Avoidance and Minimization –  
Existing Homes and Public and Private Projects

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## 5.2.1 Impact Avoidance and Minimization

The first priority for conservation of western Joshua tree and its habitat is to avoid adverse [climate](#) impacts altogether. Although climate change stress may be impossible to avoid in the short- term, other impacts are avoidable, such as project-related degradation and destruction of habitat. [However, it should be recognized that existing homes, and public and private development projects, do not have the same avoidance and minimization opportunities as new projects brought forward after the Act's adoption. Further as identified previously in this plan, such existing homes and projects may have had avoidance and minimization measures imposed under prior laws \(e.g. California Native Plant Act\). Such existing projects and essential infrastructure authorized prior to the Act's adoption are recognized as achieving their avoidance and minimization obligations by virtue of meeting their adopted obligations at the time of project approval, authorization or legislative creation. For new projects,](#) Impact avoidance should be emphasized as the first preferred choice whenever feasible, especially in areas identified as climate refugia. Furthermore, the importance of avoiding take to western Joshua tree and its habitat has been emphasized during discussions with Tribes, in particular the principle of not harming a tree unless it is absolutely critical for people (FII CPI, pers comm., 2024b).

When complete avoidance cannot be achieved, efforts should be made to minimize impacts on western Joshua tree and its habitat, and the presence of tribal cultural monitors and a trained arborist to minimize these impacts are encouraged (FII CPI, pers. comm., 2024a). Minimization may include efforts to reduce the number of trees and seeds taken; the area of habitat that is lost or degraded; the severity of impacts on individual trees; impacts on other organisms on which western Joshua tree depends; and indirect impacts on trees, seeds, habitats, and other ecologically related organisms.

The avoidance and minimization actions in this section could be voluntarily adopted and implemented by project proponents and land managers, incorporated into project approvals by local governments and regulatory agencies, or incorporated into voluntary, cooperative agreements between relevant agencies, organizations, and other parties. The Western Joshua Tree Conservation Act (WJTCA) requires the avoidance and minimization of impacts on western Joshua tree to the maximum extent practicable as a condition of obtaining a WJTCA incidental take permit (ITP) (Fish & G. Code, § 1927.3, subd. (a)(2)). WJTCA also states that the Conservation Plan shall include guidance for the avoidance and minimization of impacts on western Joshua trees and protocols for the successful relocation of western Joshua trees (Fish & G. Code, § 1927.6, subd. (a)).

The impact avoidance and minimization (A&M) management actions listed in this chapter are intended to promote the survival of existing western Joshua trees and the protection of their



habitat where they could potentially be harmed by development, human activities, and natural hazards. Impacts on western Joshua trees could occur from urban development, infrastructure construction, resource extraction, damage by people and vehicles, and other forms of landscape alteration (see Section 4.3). When these activities affect the root systems or the seedbanks of western Joshua tree, the survival of populations can be compromised.





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# Western Joshua Tree Conservation Plan

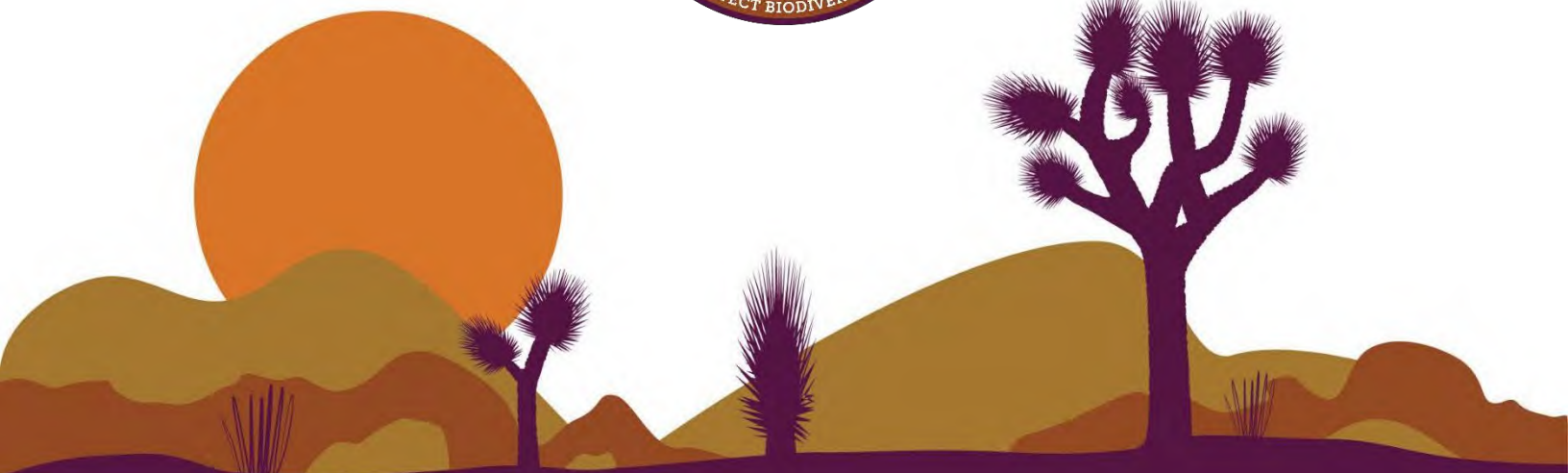


**CalCIMA Suggested Amendment 3:** Additions – Avoid Direct and Indirect Impacts  
**Add New Management Action 1.6 – Avoid Impacts from Mineral Development**

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## MANAGEMENT ACTION A&M 1: AVOID DIRECT AND INDIRECT IMPACTS

When landscape-altering projects occur near western Joshua trees, avoidance buffers should be established to avoid direct impacts on aboveground and belowground western Joshua tree parts and their seedbank. Scientific information on western Joshua tree root ball width, root zone width, and seedbank width was used to inform direct impact avoidance buffers. Direct impact buffers for avoidance should apply to ground-disturbing activities, such as construction and resource extraction, fire control and suppression, and any other actions that could harm or kill western Joshua trees or seeds. The following actions provide activity-specific guidance for direct impact avoidance.

### ***Action A&M 1.1: Retain Healthy Trees***

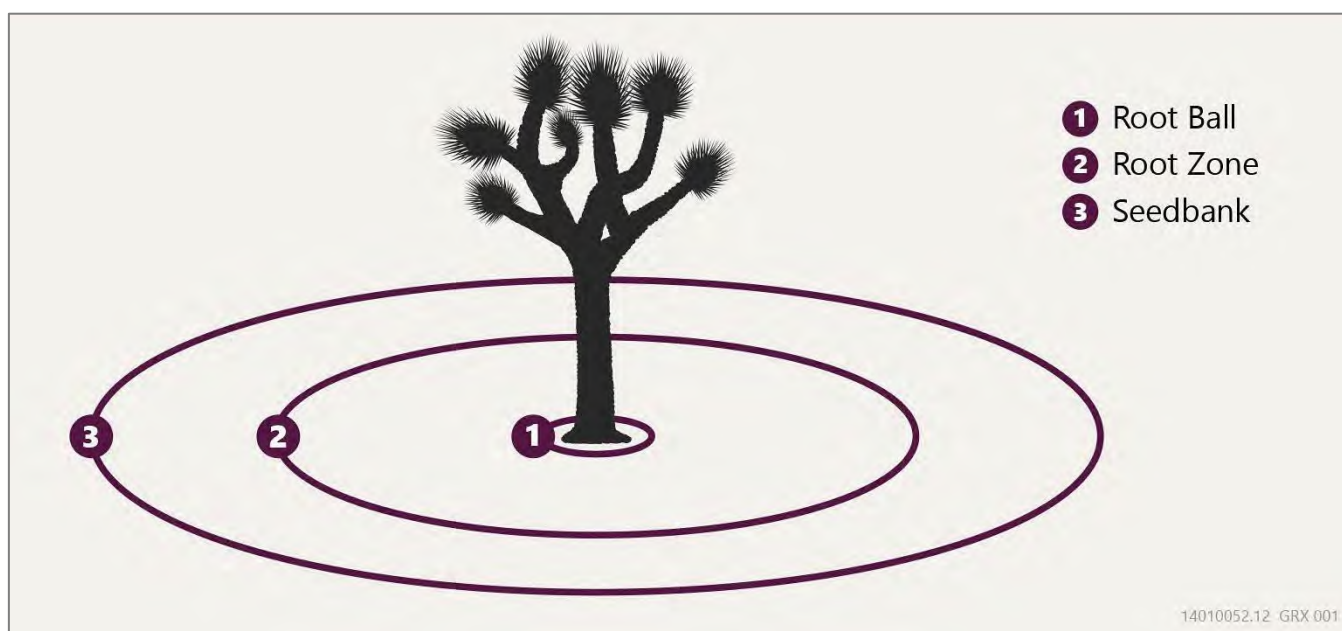
Project proponents (e.g., private and public entities) or agencies (e.g., local, state, and federal agencies) should prioritize retaining healthy western Joshua trees in place when planning a project. Mature/reproductive western Joshua trees in good condition, western Joshua trees in areas within and adjacent to contiguous suitable habitat, and western Joshua trees in habitat that is prioritized as having high value for conservation should be prioritized for retention in place. Signs a tree is healthy may include 60 percent or more living branches, minimal pest damage, recent unrestricted hard growth, recent flowering, and strong tree vigor (see Appendix E, “Relocation Guidelines and Protocols”).

### ***Action A&M 1.2: Implement Avoidance Buffers***

When activities occur in the vicinity of western Joshua trees, project proponents, land managers, and agencies should implement buffers around western Joshua trees to avoid direct impacts (see Figure 5-1). In accordance with western Joshua tree primary seed dispersal distances, root growth, and salvage techniques, CDFW recommends buffers to avoid impacts for certain activities. The recommended minimum buffers for ground disturbance are:

- 56.7 meters (186 feet) from the base of a mature (i.e., sexually reproductive) western Joshua tree to avoid impacts on the primary seed dispersal zone,
- 15 meters (50 feet) from the base of a western Joshua tree 1 meter or greater in height or 7.5 meters (25 feet) from a western Joshua tree less than 1 meter (3.3 feet) in height to avoid damage to the root zone, and
- 0.61 meters (2 feet) from the base of a western Joshua tree 1 meter or greater in height or 0.3 meters (1 foot) less than 1 meter (3.3 feet) in height to avoid impacts on the root ball (i.e., the mass of soil that contains concentrated roots growing from the base of the stem of a western Joshua tree).





*Note: Graphical representation of buffer zones (not to scale).*

*Source: Compiled by Ascent in 2024.*

### **Figure 5-1 Western Joshua Tree Buffer Zones**

These recommended buffers may be adjusted based on project-specific information and impacts. Additional information to consider when determining a buffer may include, but is not limited to:

- Density of trees within each project site as provided by the project census or other biological survey information.
- Location of a tree in relation to existing structures, such as fences, driveways, or other permanent structures.
- Intensity of proposed ground-disturbing activities (e.g., trenching and excavation impacts may be different than installing fencing).
- Duration of proposed impacts (temporary or permanent).
- Additional minimization measures to reduce impacts of buffer encroachment (e.g., supplemental watering, protecting roots and trees from access, or avoiding equipment damage, etc.).
- Geographic location (e.g., Is the project located in an urban area or within targeted climate refugia?).
- Life stage of tree, including reproductive stage. Branched trees are more likely to have produced seed and may have more extensive root structures.



Disturbances outside of these buffers are less likely to negatively affect the health and survival of the tree or its seeds. CDFW will continue to review the science including TEK on western Joshua tree during implementation of the Conservation Plan and update impact avoidance buffers as appropriate.

### ***Action A&M 1.3: Avoid Impacts during Pesticide Application***

Project proponents, landowners, land managers, and agencies should not apply pesticides on western Joshua trees and should implement best management practices that avoid pesticide drift onto western Joshua trees, nontarget native vegetation (e.g., nurse plants), pollinators, and seed-dispersing rodents. See Action A&M 1.3.1, "Avoid Impacts during Pesticide Application" in Appendix D for recommended best management practices related to this Action.

### ***Action A&M 1.4: Avoid Impacts Related to Unauthorized Vehicle Use***

Land managers should implement measures to prohibit unauthorized off-highway vehicle (OHV) and other vehicle use off designated trails in western Joshua tree habitat, such as by closing areas outside of designated routes with signage, vertical mulching, or installing other barriers. On public lands authorized for open, overland OHV recreation within western Joshua tree habitat, vehicle use rules should be modified to restrict travel to existing designated trails.

### ***Action A&M 1.5: Avoid Impacts from Overgrazing***

Land managers and regulatory agencies should prohibit grazing activities within western Joshua tree habitat if grazing is causing adverse effects. This can be accomplished by not renewing existing grazing leases, excluding portions of allotments with western Joshua trees, and installing property fences to avoid free range or trespass grazing. Feral, nonnative grazing animals (e.g., burros, horses) should be removed or relocated from western Joshua tree habitat. However, targeted grazing by prescribed herbivory may be useful to reduce annual invasive species (see Action A&M 2.7, "Minimize Impacts from Grazing Activities," and Appendix D, Action A&M 3.5.1, "Implement Fuel Treatments") (Berryman et al. 2023).

### **Action A&M 1.6: Avoid Impacts from Mineral Development**

Reclamation of surface mining operations under the Surface Mining and Reclamation Act (SMARA) is recognized as achieving minimization and avoidance where the reclamation plan includes a revegetation plan addressing western Joshua trees, including without limitation, planting and/or relocation of western Joshua trees.





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# Western Joshua Tree Conservation Plan



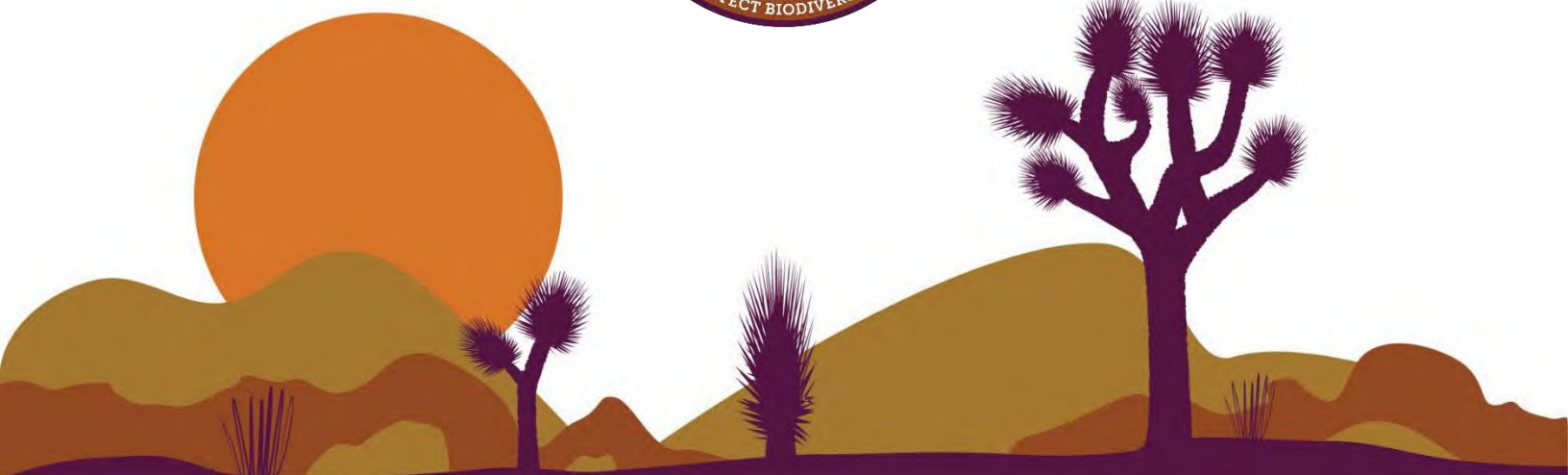
**CalCIMA Suggested Amendment 4:** Urgent Clarification Additions – Avoid Direct and Indirect Impacts

**Add New Management Action 1.7 – On-Site Relocated or Preserved Trees**

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## MANAGEMENT ACTION A&M 1: AVOID DIRECT AND INDIRECT IMPACTS

When landscape-altering projects occur near western Joshua trees, avoidance buffers should be established to avoid direct impacts on aboveground and belowground western Joshua tree parts and their seedbank. Scientific information on western Joshua tree root ball width, root zone width, and seedbank width was used to inform direct impact avoidance buffers. Direct impact buffers for avoidance should apply to ground-disturbing activities, such as construction and resource extraction, fire control and suppression, and any other actions that could harm or kill western Joshua trees or seeds. The following actions provide activity-specific guidance for direct impact avoidance.

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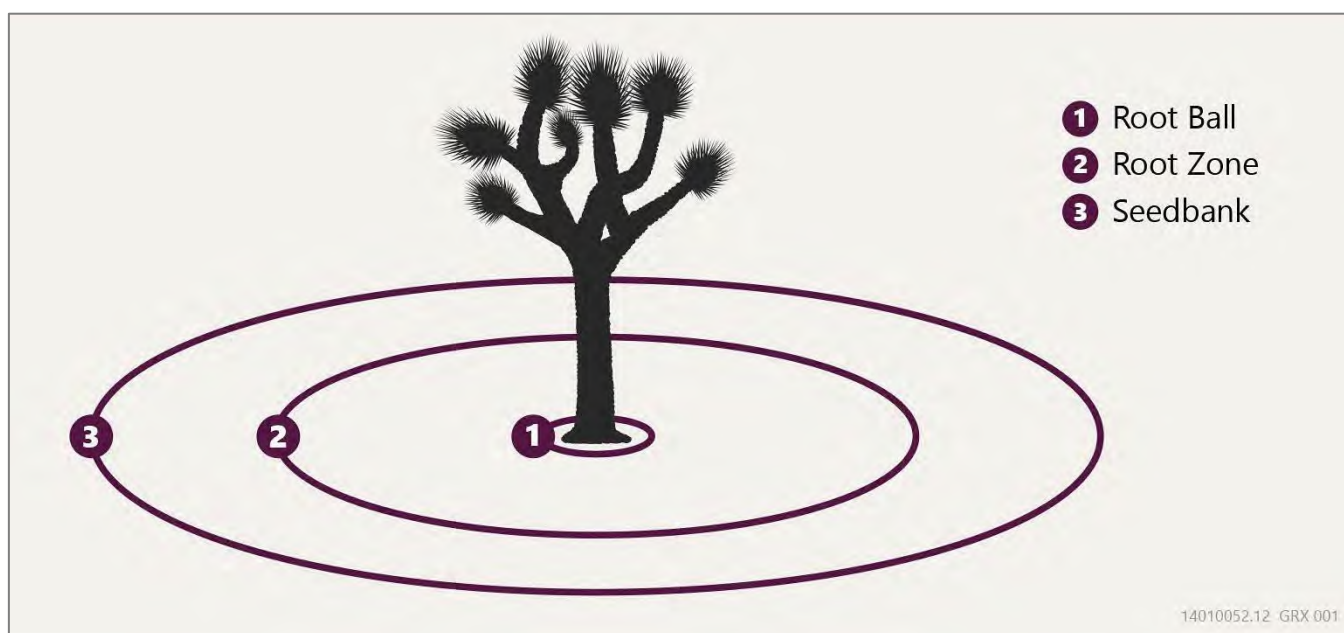
Project proponents (e.g., private and public entities) or agencies (e.g., local, state, and federal agencies) should prioritize retaining healthy western Joshua trees in place when planning a project. Mature/reproductive western Joshua trees in good condition, western Joshua trees in areas within and adjacent to contiguous suitable habitat, and western Joshua trees in habitat that is prioritized as having high value for conservation should be prioritized for retention in place. Signs a tree is healthy may include 60 percent or more living branches, minimal pest damage, recent unrestricted hard growth, recent flowering, and strong tree vigor (see Appendix E, "Relocation Guidelines and Protocols").

### ***Action A&M 1.2: Implement Avoidance Buffers***

When activities occur in the vicinity of western Joshua trees, project proponents, land managers, and agencies should implement buffers around western Joshua trees to avoid direct impacts (see Figure 5-1). In accordance with western Joshua tree primary seed dispersal distances, root growth, and salvage techniques, CDFW recommends buffers to avoid impacts for certain activities. The recommended minimum buffers for ground disturbance are:

- 56.7 meters (186 feet) from the base of a mature (i.e., sexually reproductive) western Joshua tree to avoid impacts on the primary seed dispersal zone,
- 15 meters (50 feet) from the base of a western Joshua tree 1 meter or greater in height or 7.5 meters (25 feet) from a western Joshua tree less than 1 meter (3.3 feet) in height to avoid damage to the root zone, and
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*Note: Graphical representation of buffer zones (not to scale).*

*Source: Compiled by Ascent in 2024.*

### **Figure 5-1 Western Joshua Tree Buffer Zones**

These recommended buffers may be adjusted based on project-specific information and impacts. Additional information to consider when determining a buffer may include, but is not limited to:

- Density of trees within each project site as provided by the project census or other biological survey information.
- Location of a tree in relation to existing structures, such as fences, driveways, or other permanent structures.
- Intensity of proposed ground-disturbing activities (e.g., trenching and excavation impacts may be different than installing fencing).
- Duration of proposed impacts (temporary or permanent).
- Additional minimization measures to reduce impacts of buffer encroachment (e.g., supplemental watering, protecting roots and trees from access, or avoiding equipment damage, etc.).
- Geographic location (e.g., Is the project located in an urban area or within targeted climate refugia?).
- Life stage of tree, including reproductive stage. Branched trees are more likely to have produced seed and may have more extensive root structures.





Disturbances outside of these buffers are less likely to negatively affect the health and survival of the tree or its seeds. CDFW will continue to review the science including TEK on western Joshua tree during implementation of the Conservation Plan and update impact avoidance buffers as appropriate.

### ***Action A&M 1.3: Avoid Impacts during Pesticide Application***

Project proponents, landowners, land managers, and agencies should not apply pesticides on western Joshua trees and should implement best management practices that avoid pesticide drift onto western Joshua trees, nontarget native vegetation (e.g., nurse plants), pollinators, and seed-dispersing rodents. See Action A&M 1.3.1, "Avoid Impacts during Pesticide Application" in Appendix D for recommended best management practices related to this Action.

### ***Action A&M 1.4: Avoid Impacts Related to Unauthorized Vehicle Use***

Land managers should implement measures to prohibit unauthorized off-highway vehicle (OHV) and other vehicle use off designated trails in western Joshua tree habitat, such as by closing areas outside of designated routes with signage, vertical mulching, or installing other barriers. On public lands authorized for open, overland OHV recreation within western Joshua tree habitat, vehicle use rules should be modified to restrict travel to existing designated trails.

### ***Action A&M 1.5: Avoid Impacts from Overgrazing***

Land managers and regulatory agencies should prohibit grazing activities within western Joshua tree habitat if grazing is causing adverse effects. This can be accomplished by not renewing existing grazing leases, excluding portions of allotments with western Joshua trees, and installing property fences to avoid free range or trespass grazing. Feral, nonnative grazing animals (e.g., burros, horses) should be removed or relocated from western Joshua tree habitat. However, targeted grazing by prescribed herbivory may be useful to reduce annual invasive species (see Action A&M 2.7, "Minimize Impacts from Grazing Activities," and Appendix D, Action A&M 3.5.1, "Implement Fuel Treatments") (Berryman et al. 2023).

### ***Action A&M 1.7: On-Site Relocated or Preserved Trees***

Western Joshua Trees that are relocated on-site and monitored and maintained consistent with the Western Joshua Tree Relocation Guidelines and Protocols provided by CDFW (presented in Appendix E) have a safe harbor for all non-lethal take of the tree as do trees identified as preserved on-site. Actions undertaken following the guidance of a certified arborist, a licensed landscape architect, or a biologist in support of the survival of preserved or on-site relocated trees shall presumptively demonstrate that any tree mortality was the result of unsuccessful preservation efforts, was unintentional, and that impacts to the tree had been properly avoided and minimized. These preserved and relocated trees by virtue of having already been subject to a voluntary mitigation fee under the Act are also fully mitigated in perpetuity.





**From:** Matthew Hinck <[mhinck@calportland.com](mailto:mhinck@calportland.com)>

**Sent:** Friday, May 9, 2025 01:48 PM

**To:** FGC <[FGC@fgc.ca.gov](mailto:FGC@fgc.ca.gov)>

**Subject:** CalPortland Comments on WJT Relocation Plan and Chapter 5 of Conservation Plan

Good Afternoon - Please find CalPortland comments and suggested language changes related to the Western Joshua Tree Conservation Plan and Relocation Guides.

The comments are primarily focused on the large projects and the potential for revegetation and other minimization efforts in mine reclamation areas.

Please let me know if you have any questions

Best Regards

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## 5 CONSERVATION MANAGEMENT ACTIONS AND EFFECTIVENESS CRITERIA

Management actions necessary to conserve western Joshua tree and objective, measurable criteria to assess the effectiveness of such actions are the heart of the Conservation Plan. This chapter describes the breadth of actions that are likely to be necessary to conserve western Joshua tree and provides a conceptual framework for how to use these actions to achieve the vision, purpose, and objectives of the Conservation Plan described in Chapter 1, “Introduction.”

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*“Wilderness is not a luxury but a necessity of the human spirit.”*  
— Edward Abbey

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The management actions are guidelines for conservation and the criteria help define the effectiveness of the actions; they do not create new statutory or regulatory mandates. Nevertheless, the management actions in this chapter can be used in several ways. They can be voluntarily adopted and implemented by project proponents, land managers, and philanthropists to help the species or to prevent the species from being harmed. California Native American tribes (Tribes) and the State can work together to co-manage conservation consistent with the Conservation Plan’s guidance. The management actions can also be incorporated into project approvals by local governments and regulatory agencies that authorize projects in western Joshua tree’s range in California. Researchers can implement management actions related to research, and private citizens and other organizations can implement actions related to education and awareness. Western Joshua tree conservation will require action from many different people and organizations.



Section 5.1 introduces the sources of information behind western Joshua tree conservation. Section 5.2 includes descriptions of management actions in five categories:

- Impact avoidance and minimization,
- Land conservation and management,
- Tribal co-management,
- Research to inform long-term conservation, and
- Education and awareness.

Section 5.3 provides objective, measurable criteria to assess the effectiveness of management actions, the Conservation Plan, and the Western Joshua Tree Conservation Fund (Conservation Fund) for conservation of western Joshua tree in California. Section 5.4 is intended to guide which management actions may be most impactful for conservation in specific western Joshua tree management units.

## 5.1 SCIENCE INCLUDING TRADITIONAL ECOLOGICAL KNOWLEDGE TO INFORM MANAGEMENT ACTIONS

The Conservation Plan is informed by science including Traditional Ecological Knowledge (TEK). Integration of TEK with other sources of science has been shown to lead to more sustainable, productive, and locally accepted natural resource management systems worldwide (Bussey et al. 2016). Please refer to Chapter 3, "Traditional Values and Uses of Western Joshua Tree by California Native American Tribes," for a description of California Native American uses, values, and TEK related to western Joshua tree. Refer to Section 5.2.3, below, for management actions facilitating co-equal collaboration between the State and Tribes.

The critical role of science supporting effective management and conservation of the species is reflected in the seven-step approach to conservation in the face of climate change described by Smith et al. (2023), as summarized below.

1. **Identify genetic structure and distinct populations.** The first step toward conservation is identifying genetic structure and distinct populations. Genomic (i.e., study of genes) tools can provide accurate estimates regarding populations, such as effective population size, demographic history, and population structure, which are all important for successful conservation efforts (Hohenlohe et al. 2021). Genetic data of populations can be used to identify distinct populations, as well as genes that may be responsible for adaptation to changing environments, highlighting populations that may require different management strategies (Hohenlohe et al. 2021). As discussed in Section 4.1.1, "Range and Distribution," recent research suggests that western Joshua tree populations have significant genetic differences (Smith et al. 2021) that have the potential to respond



differently to climate change (Smith et al. 2023). Population genetic data can also assist in identifying populations with high genetic diversity, which can translate to greater potential for adapting to environmental change (Smith et al. 2023).

2. **Develop species distribution models and identify climate refugia.** Developing species distribution and demographic models for distinct populations using high-quality data that document where western Joshua trees occur (i.e., occurrence data) is important for accurately identifying climate refugia that should be given high priority for protection. These models are imperative for successful species conservation (Morelli et al. 2016; Morelli et al. 2020) and will help determine the degree that climate change poses a threat to a species (Jones et al. 2016). The several species distribution models that have been developed for Joshua tree resulted in very different predictions of suitable habitat distribution by the end of the 21st century (Smith et al. 2023). The wide range of results from these models is a byproduct of different methods used and differences in input data (Smith et al. 2023). For species distribution models to be reliable, accurate occurrence data must be used, then multiple independent data sources must be used to validate models (Sweet et al. 2019). Incorporating physiological (i.e., how plants function) data can also improve the accuracy of species distribution models (Buckley et al. 2010; Evans et al. 2015). Species distribution models can help predict areas of future habitat for a species; however, these models need to include realistic estimates of the species' ability to disperse and access new areas (Bateman et al. 2013). Species distribution models may improve their ability to predict future species distributions under climate change, by incorporating the adaptive potential of populations (Bush et al. 2016; Razgour et al. 2019). Models should focus on fine scale distribution as genetic information becomes available and distinct populations are identified since they may require different management strategies (Hohenlohe et al. 2021).

An important step toward developing accurate range-wide species distribution and climate refugia models for western Joshua tree has been completed with new species distribution data recently published by Esque et al. (2023). These models used remote sensing and ground-validation methodologies to document western Joshua tree presence and absence throughout the species range. This unprecedented dataset has been used to develop climate refugia models that include identification of possible future habitat that is within dispersal range of its current distribution, but that is not currently populated by western Joshua tree (Shryock et al. forthcoming). These data informed management unit delineation in Section 4.4, "Management Units," land conservation and management actions in Section 5.2.2 (below), and management unit recommendations in Section 5.4 (below).





3. **Validate potential refugia.** Once refugia models have been developed, the next step is to validate the models using demographic data to assess population growth or decline and other data sources to confirm that the potential refugia will be viable in the long term (Sweet et al. 2019). Demographic data can have considerable influence on predicted future species distributions and in validating predicted climate refugia (Merow et al. 2014). Spatial patterns of recruitment can also be used as a predictor of potential climate refugia, which could be compared to predictions based on climate models (Barrows et al. 2020a, 2020b). In addition, incorporating information on the adaptive potential of populations into species distribution models may improve model accuracy for future distribution predictions under climate change (Bush et al. 2016; Razgour et al. 2019).
4. **Assess adaptive genetic variation.** After genetic structure and distinct populations have been identified, the next step is to assess adaptive genetic variation within populations using either association genetics (i.e., identification of genes or genetic markers with underlying important traits) or ideally, experimental approaches coupled with genomic data (Smith et al. 2023). Conservation genetics should focus on the protection of adaptive genetic variation to help manage species that are dealing with climate change (Razgour et al. 2019). Adaptive genetic variation directly affects a species' ability to respond to environmental factors, such as heat stress and drought, highlighting the importance of conserving adaptive genetic variation and not just overall genetic variation (Smith et al. 2023). Landscape genomics (i.e., study of how genetic variation is distributed between populations across a species range) and association genetics can identify genes or genetic markers that are likely the basis for local adaptation to climate variation in current populations (Lotterhos and Whitlock 2015).



Source: Jeb Bjerke, California Department of Fish and Wildlife.

Genome-wide association studies looking at seedling survival, growth, and specific ecophysiological traits (i.e., physiological processes crucial for interacting with the environment, including gas exchange and water regime) can potentially identify genes underlying climate adaptation (Smith et al. 2023), which can be used to predict these traits in natural populations (Swarts et al. 2017). Studies in common gardens are





particularly important because they can be used to validate the adaptive value of identified genes or genetic markers and reveal underlying physiological mechanisms (Weigel and Nordborg 2015). Common garden experiments are indoor or outdoor plantings of species or populations collected from multiple distinct geographic locations, grown together under shared conditions (Schwinning et al. 2022).

Current common garden research within the US Geological Survey's Mojave Desert Common Gardens network uses Joshua tree seedlings from different locations that are planted outside in various climates throughout the Mojave Desert and in the lab. This research can help determine the extent to which different populations of Joshua tree are adapted to certain local climate conditions and identify the physiological mechanisms by which Joshua trees tolerate drought and heat stress (Smith et al. 2023). Another effort to identify Joshua tree genes and genetic markers associated with specific climate variables is supported by Revive and Restore, a leading wildlife conservation nonprofit organization, to sequence the whole genome from individual Joshua trees sampled across the range of climates in which the species occurs (Smith et al. 2023).

Once climate-associated genes or genetic markers have been identified, the next step will be genotyping (i.e., analyzing genome sequence data) wild populations of Joshua tree to predict long-term potential of adaptation to warming climates (Smith et al. 2023). Populations identified to have the highest probability of adaptation and survival should be prioritized for conservation (Smith et al. 2023).

5. **Identify high priority areas for protection.** Informed by the results of the four steps described above, the next step will be to identify locations within each population that should have the highest priority for protection (Morelli et al. 2020). Determining whether there are any areas slated for development that contain climate refugia and then taking steps to try to protect these areas will be important (Smith et al. 2023). A Mojave Desert ecoregional assessment (Randall et al. 2010; Parker et al. 2018), which identified conservation value for a large portion of the western Joshua tree range, can also be used to help prioritize conservation lands. Even areas that have been identified as highly degraded may still have conservation value if potential refugia is present (Smith et al. 2023). In addition, some areas that have been identified as ecologically intact may experience severe damage due to climate change and, therefore, may have little long-term conservation value (Smith et al. 2023).

Identification of high priority areas for protection to further the conservation of western Joshua tree will be completed as needed by CDFW and partners and will be supported by information produced by the research and tribal communities. While it would be ideal to complete steps 1 through 4 before prioritizing areas for protection, CDFW must



begin work to conserve western Joshua tree immediately and must therefore begin initial prioritization of areas for protection based on the best, currently available information. As additional information generated from steps 1 through 4 becomes available, CDFW will incorporate it into decision making and future updates of the Conservation Plan.

An initial land-prioritization scheme guided by Smith et al. (2023) has been developed by CDFW (described in Section 5.2.2) to help identify high priority areas for protection.

6. **Protect priority areas while accommodating compatible existing and emerging land uses.** Informed by the results of step 5, high priority areas should be protected while accommodating existing and emerging land uses that are compatible with the overall western Joshua tree conservation strategy (Henson et al. 2018). This work should be done in collaboration with California Native American tribes, state and federal government agencies, local jurisdictions, nongovernmental organizations (NGOs), the public, and affected businesses and property owners. The Mojave Desert region is the homeland territory of many California Native American tribes and is made up of a diverse patchwork of land owned by tribes, federal, state, and local land ownerships and jurisdictions, including the National Park Service (NPS), the Bureau of Land Management (BLM), the US Forest Service (USFS), as well as state and county reserves (Smith et al. 2023). Focus should be on landscape-scale conservation criteria while also engaging with the public to create broad public support (Smith et al. 2023). CDFW will use the Conservation Fund to conserve priority lands.
7. **Identify other impacts and develop management to mitigate them.** The last step is to identify additional factors beyond climate change that could negatively affect the persistence of western Joshua tree (e.g., invasive species, incompatible recreation, inappropriate fire frequencies) and management efforts, including traditional cultural practices, to mitigate these impacts (Morelli et al. 2020). Other impacts on the persistence of western Joshua tree are identified in Section 4.3, "Key Stressors, Threats, and Conservation Issues," and mitigation approaches for them are presented in Section 5.2.1.





Source: Anna Cirimele, National Park Service.

There are marked challenges with identifying and protecting existing populations that meet all the necessary criteria for conservation. Some scientists have suggested assisted migration (i.e., human-assisted movement of species in response to climate change) as a management strategy for species limited by dispersal ability, such as Joshua tree (Cole et al. 2011; Williams and Dumroese 2013). However, some ecologists have strongly criticized assisted migration for its potential to promote invasive species, spread pathogens, and disrupt ecosystems (Ricciardi and Simberloff 2009). Assisted migration may have a high rate of failure if species or populations are strongly adapted to local conditions that are not present at the introduction site (Vitt et al. 2010). Although assisted migration has been suggested for Joshua trees, Smith et al. (2023) do not advise this method. This is partially due to suspected high costs and logistical planning needed for success, as well as this approach not preserving intact, functional ecosystems. In addition to what is outlined in Smith et al. (2023), given that there are climate refugia modeled within the current range of western Joshua tree (Shryock et al. forthcoming), it would be easier to protect the trees where they are currently growing compared with moving them to new places outside the current range. If assisted migration were employed, these areas could still need protection, the trees could need support to establish new self-sustaining populations, and the presence of tribal cultural monitors and a trained arborist may be encouraged (FII CPI, pers. comm. 2024b). More research is needed on assisted migration for western Joshua tree, which is addressed in Action R&I 1.12, "Investigate Assisted Migration."



Ongoing research and field experiences by public agencies, Tribes, NGOs, and academic institutions will continue to improve the information for western Joshua tree conservation. The Conservation Plan will be reviewed every 2 years, at which time, new information relevant to the Conservation Plan's goals, management actions, and effectiveness criteria will be incorporated to maintain the standard of applying science including TEK to decision-making. If relevant science is published or new information is available in the middle of an update cycle, updated management approaches may be implemented before the next update of the Conservation Plan, at the discretion and recommendation of CDFW.

## 5.2 MANAGEMENT ACTIONS NECESSARY TO CONSERVE WESTERN JOSHUA TREE

To achieve the Conservation Plan vision, purpose, and objectives described in Section 1.2, "Conservation Plan Vision, Purpose, and Objectives," five major categories of management actions have been identified: avoidance and minimization, land conservation and management, tribal co-management, research to inform long-term conservation, and education and awareness (Table 5-1). Specific management actions within each of these categories are discussed in more detail below. In addition, Appendix D, "Avoidance and Minimization Best Management Practices and Guidelines" provides detailed guidance for implementing management actions that avoid or minimize adverse impacts on western Joshua tree.

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*"Our task must be to free ourselves...by widening our circle of compassion to embrace all living creatures and the whole of nature and its beauty"*  
*-Albert Einstein*

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**Table 5-1 Management Actions**

| Management Action Title                        | Management Action Topic                                                                                                                                                           |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A&M: Avoidance and Minimization                | Avoidance and minimization to lessen negative effects of human activities.                                                                                                        |
| LC&M: Land Conservation and Management         | Land conservation and management to protect existing populations and increase abundance.                                                                                          |
| TCM: Tribal Co-Management                      | Tribal co-management that reflects California Native American tribes' interests and priorities, improves decision-making, protects existing populations, and increases abundance. |
| R&I: Research to Inform Long-Term Conservation | Research to inform long-term conservation and improve decision-making.                                                                                                            |
| E&A: Education and Awareness                   | Education and awareness to increase public support and lessen the negative effects of human activities.                                                                           |



## 5.2.1 Impact Avoidance and Minimization

The first priority for conservation of western Joshua tree and its habitat is to avoid adverse impacts altogether. Although climate change stress may be impossible to avoid in the short-term, other impacts are avoidable, such as project-related degradation and destruction of habitat. Impact avoidance should be emphasized as the first preferred choice whenever feasible, especially in areas identified as climate refugia. Furthermore, the importance of avoiding take to western Joshua tree and its habitat has been emphasized during discussions with Tribes, in particular the principle of not harming a tree unless it is absolutely critical for people (FII CPI, pers comm., 2024b).

When complete avoidance cannot be achieved, efforts should be made to minimize impacts on western Joshua tree and its habitat, and the presence of tribal cultural monitors and a trained arborist to minimize these impacts are encouraged (FII CPI, pers. comm., 2024a). Minimization may include efforts to reduce the number of trees and seeds taken; the area of habitat that is lost or degraded; the severity of impacts on individual trees; impacts on other organisms on which western Joshua tree depends; and indirect impacts on trees, seeds, habitats, [revegetation and restoration of habitat](#), and other ecologically related organisms.

The avoidance and minimization actions in this section could be voluntarily adopted and implemented by project proponents and land managers, incorporated into project approvals by local governments and regulatory agencies, or incorporated into voluntary, cooperative agreements between relevant agencies, organizations, and other parties. The Western Joshua Tree Conservation Act (WJTCA) requires the avoidance and minimization of impacts on western Joshua tree to the maximum extent practicable as a condition of obtaining a WJTCA incidental take permit (ITP) (Fish & G. Code, § 1927.3, subd. (a)(2)). WJTCA also states that the Conservation Plan shall include guidance for the avoidance and minimization of impacts on western Joshua trees and protocols for the successful relocation of western Joshua trees (Fish & G. Code, § 1927.6, subd. (a)).

The impact avoidance and minimization (A&M) management actions listed in this chapter are intended to promote the survival of existing western Joshua trees and the protection of their habitat where they could potentially be harmed by development, human activities, and natural hazards. Impacts on western Joshua trees could occur from urban development, infrastructure construction, resource extraction, damage by people and vehicles, and other forms of landscape alteration (see Section 4.3). When these activities affect the root systems or the seedbanks of western Joshua tree, the survival of populations can be compromised.





## MANAGEMENT ACTION A&M 1: AVOID DIRECT AND INDIRECT IMPACTS

When landscape-altering projects occur near western Joshua trees, avoidance buffers should be established to avoid direct impacts on aboveground and belowground western Joshua tree parts and their seedbank. Scientific information on western Joshua tree root ball width, root zone width, and seedbank width was used to inform direct impact avoidance buffers. Direct impact buffers for avoidance should apply to ground-disturbing activities, such as construction and resource extraction, fire control and suppression, and any other actions that could harm or kill western Joshua trees or seeds. The following actions provide activity-specific guidance for direct impact avoidance.

### ***Action A&M 1.1: Retain Healthy Trees***

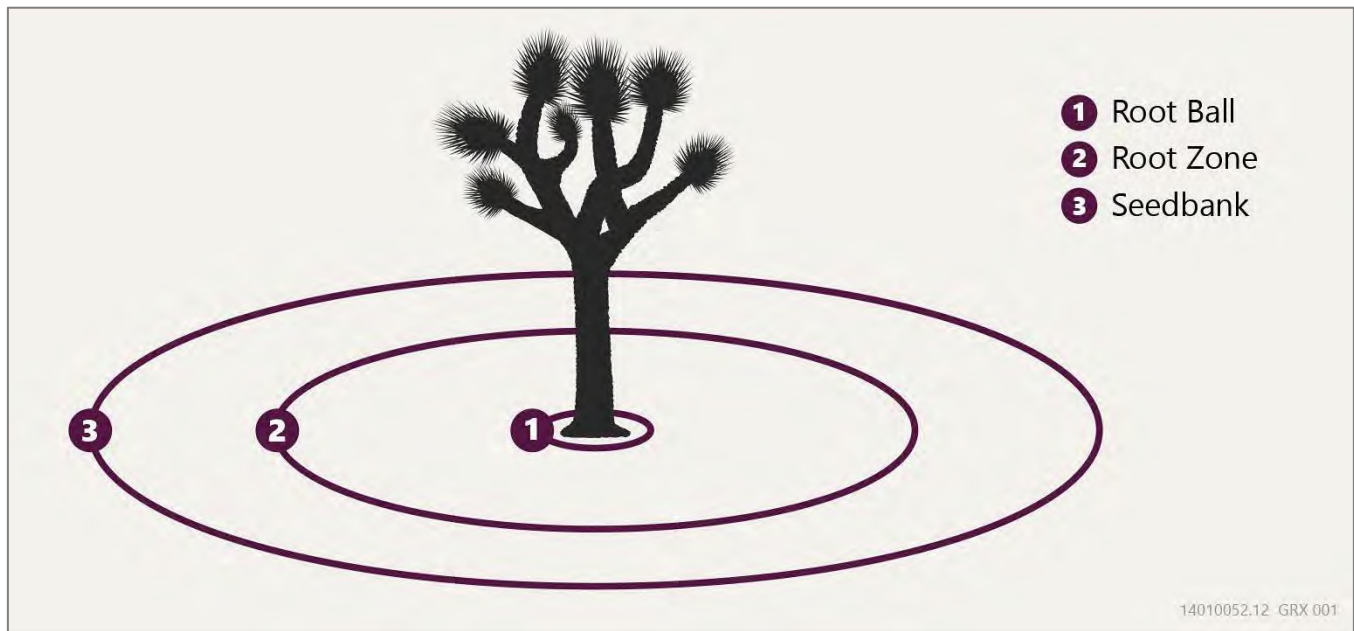
Project proponents (e.g., private and public entities) or agencies (e.g., local, state, and federal agencies) should prioritize retaining healthy western Joshua trees in place when planning a project. Mature/reproductive western Joshua trees in good condition, western Joshua trees in areas within and adjacent to contiguous suitable habitat, and western Joshua trees in habitat that is prioritized as having high value for conservation should be prioritized for retention in place. Signs a tree is healthy may include 60 percent or more living branches, minimal pest damage, recent unrestricted hard growth, recent flowering, and strong tree vigor (see Appendix E, “Relocation Guidelines and Protocols”).

### ***Action A&M 1.2: Implement Avoidance Buffers***

When activities occur in the vicinity of western Joshua trees, project proponents, land managers, and agencies should implement buffers around western Joshua trees to avoid direct impacts (see Figure 5-1). In accordance with western Joshua tree primary seed dispersal distances, root growth, and salvage techniques, CDFW recommends buffers to avoid impacts for certain activities. The recommended minimum buffers for ground disturbance are:

- 56.7 meters (186 feet) from the base of a mature (i.e., sexually reproductive) western Joshua tree to avoid impacts on the primary seed dispersal zone,
- 15 meters (50 feet) from the base of a western Joshua tree 1 meter or greater in height or 7.5 meters (25 feet) from a western Joshua tree less than 1 meter (3.3 feet) in height to avoid damage to the root zone, and
- 0.61 meters (2 feet) from the base of a western Joshua tree 1 meter or greater in height or 0.3 meters (1 foot) less than 1 meter (3.3 feet) in height to avoid impacts on the root ball (i.e., the mass of soil that contains concentrated roots growing from the base of the stem of a western Joshua tree).





Note: Graphical representation of buffer zones (not to scale).

Source: Compiled by Ascent in 2024.

### Figure 5-1 Western Joshua Tree Buffer Zones

These recommended buffers may be adjusted based on project-specific information and impacts. Additional information to consider when determining a buffer may include, but is not limited to:

- Density of trees within each project site as provided by the project census or other biological survey information.
- Location of a tree in relation to existing structures, such as fences, driveways, or other permanent structures.
- Intensity of proposed ground-disturbing activities (e.g., trenching and excavation impacts may be different than installing fencing).
- Duration of proposed impacts (temporary or permanent).
- Additional minimization measures to reduce impacts of buffer encroachment (e.g., supplemental watering, protecting roots and trees from access, or avoiding equipment damage, etc.).
- Geographic location (e.g., Is the project located in an urban area or within targeted climate refugia?).
- Life stage of tree, including reproductive stage. Branched trees are more likely to have produced seed and may have more extensive root structures.



Disturbances outside of these buffers are less likely to negatively affect the health and survival of the tree or its seeds. CDFW will continue to review the science including TEK on western Joshua tree during implementation of the Conservation Plan and update impact avoidance buffers as appropriate.

### ***Action A&M 1.3: Avoid Impacts during Pesticide Application***

Project proponents, landowners, land managers, and agencies should not apply pesticides on western Joshua trees and should implement best management practices that avoid pesticide drift onto western Joshua trees, nontarget native vegetation (e.g., nurse plants), pollinators, and seed-dispersing rodents. See Action A&M 1.3.1, "Avoid Impacts during Pesticide Application" in Appendix D for recommended best management practices related to this Action.

### ***Action A&M 1.4: Avoid Impacts Related to Unauthorized Vehicle Use***

Land managers should implement measures to prohibit unauthorized off-highway vehicle (OHV) and other vehicle use off designated trails in western Joshua tree habitat, such as by closing areas outside of designated routes with signage, vertical mulching, or installing other barriers. On public lands authorized for open, overland OHV recreation within western Joshua tree habitat, vehicle use rules should be modified to restrict travel to existing designated trails.

### ***Action A&M 1.5: Avoid Impacts from Overgrazing***

Land managers and regulatory agencies should prohibit grazing activities within western Joshua tree habitat if grazing is causing adverse effects. This can be accomplished by not renewing existing grazing leases, excluding portions of allotments with western Joshua trees, and installing property fences to avoid free range or trespass grazing. Feral, nonnative grazing animals (e.g., burros, horses) should be removed or relocated from western Joshua tree habitat. However, targeted grazing by prescribed herbivory may be useful to reduce annual invasive species (see Action A&M 2.7, "Minimize Impacts from Grazing Activities," and Appendix D, Action A&M 3.5.1, "Implement Fuel Treatments") (Berryman et al. 2023).

## **MANAGEMENT ACTION A&M 2: MINIMIZE DIRECT AND INDIRECT IMPACTS**

If avoidance is not feasible, direct and indirect impacts on western Joshua tree and its habitat should be minimized. When landscape-altering projects occur near western Joshua trees, effort should be made to minimize direct impacts on western Joshua tree. The following actions provide activity-specific guidance for direct impact minimization.

### ***Action A&M 2.1: Minimize Impacts from Climate Change***

Climate change is a significant threat to western Joshua tree. All entities, including governments, businesses, and individuals should reduce greenhouse gas emissions to help minimize the impacts of climate change on species (IPCC 2023).



**Action A&M 2.2: Minimize Impacts on Occupied Western Joshua Tree Habitat**

Landowners, developers, and land managers should minimize the area of western Joshua tree habitat that is directly affected by their activities, and minimize the number of trees that are taken or harmed. Minimization of habitat disturbance should include minimizing impacts on areas with nurse plants and minimizing disruption of the movements of small mammal seed dispersers (e.g., not using rodent barrier fencing). Western Joshua tree habitat that is in good condition, in ecologically core or intact areas, and within predicted climate refugia should be prioritized first for avoidance and conservation, but if this avoidance is not feasible, impacts on these areas should be minimized to the maximum extent possible. The importance of minimizing harm to western Joshua trees and their habitat has been emphasized during discussions with Tribes. It is important for trained tribal cultural monitors to be present during destruction or removal of western Joshua trees to provide cultural protection of trees and respect ancestral lands (FIICPI, pers. comm., 2024b).



**Action A&M 2.3: Relocate Trees**

Western Joshua trees should be relocated when project proponents, landowners, developers, and land managers are unable to retain trees in place or when there is a high probability of substantially damaging or lethal impacts occurring to a retained tree. Project proponents, landowners, land managers, and agencies should follow the Western Joshua Tree Relocation Guidelines and Protocols provided by CDFW (presented in Appendix E) when determining whether a tree should be relocated or not. Appendix E also provides a detailed protocol for conducting tree relocations, including recommendations for selecting relocation areas,





consideration of maintaining genetic integrity of healthy receiver western Joshua tree populations, methods for physically relocating the tree, types of relocation, and maintenance and monitoring standards. It is important for trained tribal cultural monitors to be present during transplantation of western Joshua trees to provide cultural protection of trees and ensure proper removal methods are followed (FII CPI pers comm 2024b). Relocation may not be required when the number of trees to be relocated is so large that revegetation and/or restoration of habitat is more feasible and practicable than relocation.

#### **Action A&M 2.4: Collect and Store Seeds**

Collection and long-term storage of viable western Joshua tree seeds can preserve local genetic diversity and therefore can help minimize the loss of western Joshua tree diversity from project activities. In addition, seeds kept in long-term conservation storage can provide source material for restoration of existing habitat or outplanting to other viable locations (such as climate refugia) and can be used to inform conservation, including targeting locations for conservation nurseries. Seed collection and storage activities should follow Center for Plant Conservation's *CPC Best Conservation Practices to Support Species Survival in the Wild* (CPC 2019) or other accepted standards, and seed collection and storage may be a required minimization measure in western Joshua tree incidental take permits issued by CDFW. CDFW may provide additional specific guidelines and methods for using western Joshua tree seed collection as a minimization measure in the future and update recommendations in the Conservation Plan if necessary.

#### **Action A&M 2.5: Minimize Impacts from Invasive Plants**

Project proponents, landowners, land managers, and agencies should implement best management practices to prevent the spread of invasive plants (Cal-IPC 2012) for all activities that have the potential to spread invasive species in western Joshua tree habitat. These activities include but are not limited to construction, resource extraction, OHV use, outdoor recreation, fire control and suppression, fuel treatment implementation, and grazing. See Appendix D, Action A&M 2.5.1, "Minimize Impacts from Invasive Plants" for best management practices.

#### **Action A&M 2.6: Minimize Impacts during Pesticide Application**

Project proponents, landowners, land managers, and agencies should implement best management practices that minimize pesticide drift or other inadvertent contact affecting western Joshua trees and other nontarget native vegetation (e.g., nurse plants) (see Appendix D, Action A&M 2.6.1, "Minimize Impacts during Pesticide Application").

#### **Action A&M 2.7: Minimize Impacts from Grazing Activities**

When grazing is adversely affecting western Joshua tree, landowners, land managers, and





grazing practitioners should decrease grazing intensity when complete avoidance is not feasible (see Action A&M 1.5, “Avoid Impacts from Overgrazing”). Guidance to minimize the



impact of grazing can include implementing rotational grazing, lowering stocking rates and the allowable annual forage utilization rate, implementing short grazing periods for herds and long post-recovery (i.e., rest) periods, and retaining sufficient litter and plant cover to protect the soil from erosion and allow plant regrowth. In areas where western Joshua trees are recovering from wildland fire, grazing should be suspended to allow resprouts and seedlings to establish (See Appendix D, Action A&M 3.3.1, “Minimize Impacts from Postfire Rehabilitation”). In addition, incompatible land uses, such as livestock grazing, should be addressed through the restoration design (see Action L&M 4.3, “Develop and Implement Restoration/Enhancement Plans”). Land managers and project proponents should consult with CDFW prior to implementing prescribed grazing to ensure potential impacts including but not limited to disease transfer to special-status species, including bighorn sheep, are avoided.

### ***Action A&M 2.8: Minimize Impacts from OHV Use and Outdoor Recreation***

On public lands where OHV recreation is allowed, land managers should restrict OHV use to designated roads and trails. If new trails are developed, they should avoid western Joshua tree populations. Land managers should encourage responsible OHV use behaviors through continued implementation of education programs to minimize damage to western Joshua tree root systems, nurse plants, and seedbanks. Education programs should emphasize practice and principles for responsible outdoor recreation, such as those provided by Tread Lightly (Tread Lightly 2024) and other organizations.

### ***Action A&M 2.9: Revegetation and Restoration of Habitat***

Where avoidance and relocation are not feasible (for example, when there are an extensive number of trees), revegetation and/or restoration of habitat can be utilized to minimize impacts. Revegetation and/or restoration undertaken pursuant to an existing statutory scheme requiring success criteria, monitoring, and financial assurances to ensure completion of the revegetation and/or restoration can satisfy this management action.

## **MANAGEMENT ACTION A&M 3: MINIMIZE IMPACTS FROM WILDLAND FIRE AND FIRE MANAGEMENT**

Wildland fire is a significant threat to western Joshua tree, but efforts to reduce wildland fire risks, fight active wildland fires, and restore landscapes after fires can also damage western Joshua trees and their habitat. This management action includes activities to minimize impacts on western Joshua tree from wildland fire, and from fire risk reduction, suppression, and postfire restoration activities. Wildland fire is unpredictable; however, planned activities for responding to wildland fire events can effectively minimize impacts on western Joshua tree habitat.

### ***Action A&M 3.1: Fight Active Wildland Fires***

Land managers and wildland fire responders should aggressively fight and contain active



wildland fires in or near western Joshua tree habitat to protect the habitat, minimize loss of western Joshua trees, and sustain western Joshua tree habitat values.



### **Action A&M 3.2: Minimize Impacts from Fire Suppression**



Bulldozer, firefighter, and fire engine conducting fire suppression efforts on the Elk Fire in 2024

Source: Hannah Schwalbe, National Park Service.

To minimize impacts on western Joshua trees and their habitats caused by wildland fire suppression response, when it does not threaten the safety of firefighters, the public, or important infrastructure, land managers and wildland fire responders should minimize direct and indirect tree damage or removal, ground disturbance in western Joshua tree habitat, and degradation of habitat values from fire suppression and control activities. Minimum Impact Suppression Techniques (MIST) and best management practices are provided in Appendix D, Action A&M 3.2.1,

"Minimize Impacts from Fire Suppression." Examples of best practices for wildland fire response include using preexisting fuel breaks as fire lines and stopping all habitat-damaging tactics as soon as they are no longer required.

### **Action A&M 3.3: Minimize Impacts from Postfire Rehabilitation**

Land managers should minimize direct impacts on western Joshua trees after a wildland fire by developing and implementing measures when rehabilitating burned areas. A postfire monitoring plan should include measures to protect existing western Joshua trees, replant western Joshua trees using appropriate seed sources if they no longer exist, replant other native species, control invasive plants, and protect exposed soil as part of plans for landscape revegetation. Appendix D, Action A&M 3.3.1, "Minimize Impacts from Postfire Rehabilitation" contains specific elements to include in a postfire monitoring and control plan.

### **Action A&M 3.4: Minimize Accidental Ignition of Fires**

Best management practices should reduce the potential for accidental ignition of wildland fires and be implemented during construction, outdoor recreation activities, operation and maintenance of infrastructure, and other activities involving overland use of motorized vehicles or mechanical equipment. Fire extinguishers, backpack sprayers, water trailers, or water tenders equipped with hoses should be available to suppress accidental ignitions during hot, dry, or windy conditions. To reduce the potential sources of ignition that may accidentally burn vegetation, best management practices should be implemented as described in Appendix D, Action A&M 3.4.1, "Minimize Accidental Ignition of Fires."



### **Action A&M 3.5: Implement Fuel Treatments**

Fuel treatments in the vicinity of western Joshua trees could be conducted when appropriate, such as when high fuel loads are present (e.g., invasive plants) or when an area has burned more frequently than the natural fire return interval.

Land managers should develop and implement measures to avoid and minimize direct impacts on western Joshua trees during fuel treatment for wildland fire risk reduction. Several types of fuel treatments that could be implemented in western Joshua tree habitat include fuel breaks, treatments in the wildland-urban interface, and treatments focused on removing invasive species and restoring areas to the natural fire regime (i.e., ecological restoration). Fuel breaks (areas cleared of vegetation or graded as a fuel treatment in anticipation of a fire) have been found to be ineffective at containing wildland fire under certain circumstances, for example high winds (Syphard et al. 2011; Oliveira et al. 2016), but they are useful for firefighter access (Syphard et al. 2011). Treatments in the wildland-urban interface “consist of strategic removal of vegetation to prevent or slow the spread of non-wind driven wildland fire between structures and wildlands, and vice versa” (California Board of Forestry and Fire Protection 2019). Fuel treatments designed for ecological restoration are intended to restore “degraded, damaged, or destroyed ecosystems and habitats to conditions associated with a natural fire regime” and may be implemented in areas where invasive species such as red brome (*Bromus rubens*), cheatgrass (*Bromus tectorum*), Sahara mustard (*Brassica tournefortii*), stinknet (*Oncosiphon pilulifer*), Russian-thistle (*Salsola tragus*), or red-stemmed filaree (*Erodium cicutarium*) or dead, woody debris have increased in cover and have resulted in a shift in the fire regime (Brooks and Minnich 2018; Cal-IPC 2024). Additional guidance to avoid and minimize impacts on western Joshua tree and its habitat during fuel treatments can be found in Appendix D, Action A&M 3.5.1 “Implement Fuel Treatments.”

## **5.2.2 Land Conservation and Management**

With climate change as a primary threat to western Joshua tree, protecting and managing lands that are occupied by the species and predicted to be climate refugia are high priorities for conserving the species. Managing climate change refugia and maintaining ecological functions necessary for western Joshua tree survival also allows time for natural systems to adapt and for humans to develop longer-term solutions for conservation (Peterson et al. 2011).

The goal of land conservation is to permanently protect western Joshua tree habitat from development and other incompatible human uses. Conserving lands before habitat degradation and destruction occur is a critical first step toward ensuring the land remains occupied by and suitable for western Joshua tree in the future.





The goal of land management is to create and maintain environmental conditions on conserved land that promote viable populations of western Joshua trees and their habitat. The threats from climate change, wildland fire, invasive species, and other human activities may still be present after land is permanently protected from development. Land management will be necessary to avoid, minimize, and remediate these threats on a long-term basis to ensure that conserved lands continue to support sustained populations of western Joshua trees and the natural processes on which they depend.

Land conservation and management actions have been developed with principles of conservation biology in mind and will be a critical component in achieving the goals of the Conservation Plan.

## **MANAGEMENT ACTION LC&M 1: IDENTIFY PRIORITY CONSERVATION LANDS**

With finite resources available for conservation efforts, CDFW will define criteria for prioritizing lands that are most suited to the persistence of western Joshua tree. The criteria will help guide agencies, NGOs, Tribes, and others in protecting conservation land. Smith et al. (2023) suggest that western Joshua tree conservation efforts focus on protecting populations that meet criteria for resiliency to climate change and that have demographic signatures of long-term viability. Protecting lands that are already occupied by western Joshua tree should also be prioritized because establishing populations of western Joshua tree in new areas is extremely challenging, sometimes controversial, and costly with a high risk of failure.

Smith et al. (2023) recommend the following four steps (which are summarized further in Section 5.1 under the seven-step approach to conservation) for identifying locations within western Joshua tree populations that should have highest priority for protection:

1. Identify genetic structure and distinct populations.
2. Develop species distribution models for these populations using high-quality occurrence data to identify climate refugia.
3. Validate potential refugia using demographic studies and other independent data sources.
4. Assess adaptive genetic variation within populations, using either association genetics or, ideally, experimental approaches coupled with genomic data.

Detailed information on the genetic structure, distinct populations, and the adaptive genetic variation of western Joshua tree is not currently known. A species distribution model for western Joshua tree using high-quality occurrence data was developed by Esque et al. (2023) and has been applied to a model developed to identify western Joshua tree climate refugia range-



wide (Shryock et al. forthcoming). Categories of climate refugia based on these data (described in Section 4.4, “Management Units”) were used to help identify priority conservation lands. Detailed range-wide data from western Joshua tree demographic studies to validate potential refugia are not yet available but will be incorporated into the Conservation Plan in the future.

The intactness of ecosystems is an important predictor of ecosystem function and overall conservation value. Ecosystems that are more intact are better equipped to support western Joshua tree habitat functions and are essential for maintaining the species in the future. Parker et al. (2018) updated the ecological assessment conducted by Randall et al. (2010) and assessed the conservation value of areas that overlap western Joshua tree’s range as part of an assessment of the impacts of solar and wind development in two locations in California. This assessment was conducted on a coarse scale—2.59 square kilometers (1 square mile) hexagons—based on 2017 conditions. Parker et al. (2018) assigned each hexagon one of the following four conservation values (in order of decreasing value) from the Randall et al. (2010) framework: ecologically core, ecologically intact, moderately degraded, and highly converted.



Young western Joshua trees growing at high elevation of 5,817 feet

Source: Michael Faist, National Park Service.



As a range-wide strategy, CDFW will apply conservation priority to the areas identified as climate refugia (comprising categories of predicted and buffered climate refugia, and unoccupied future suitable habitat; see Section 4.4) or assigned conservation values of ecologically core or intact, recognizing they will be the areas most valuable for western Joshua tree in the future. Areas of climate refugia that are moderately degraded may also be valuable for western Joshua tree in the future. Additional information on climate refugia and ecological intactness is in Section 4.4.

On a local scale, CDFW will identify priority conservation lands based on the best available site data relevant to western Joshua tree's ecological needs for long-term viability. Available information will be analyzed initially, and additional information will be collected to properly assess the relative conservation value of the evaluated lands.

Synthesizing the characteristics of land with the highest conservation value for western Joshua tree, priority conservation lands should possess all or at least some of the following attributes:

- A large area occupied by western Joshua tree.
- A high density of reproductive adult individuals.
- Presence within predicted climate refugia.
- A high recruitment rate.
- Presence of pollinator moths, nurse plants, and small mammal seed dispersers.
- Low risk of stressors from adjacent land use (e.g., fire ignition risk, invasive species encroachment, OHV-related damage, planned development; disturbance from high-traffic roads).
- High-value lands that currently have little to no protection.
- Good overall tree health within populations (e.g., few signs of pests, damage, exposed roots, or health problems; higher vigor; trees and limbs upright).
- Large patch size (low perimeter-to-edge ratio) and connectivity to other areas occupied by western Joshua tree.
- Connectivity to climate refugia, such as landscape connections across elevation gradients and ecological transition zones (e.g., where desert communities transition to montane communities of the Sierra Nevada and Transverse ranges [Randall et al. 2010] and between the Mojave Desert and Great Basin).
- Genetically distinct populations with adaptive genetic diversity.



A weighted scoring system is useful for evaluating and prioritizing potential conservation lands. CDFW has used the preliminary lands assessment criteria (presented in Appendix F, “Conservation Lands Prioritization Assessment”) as an initial tool to help focus Conservation Fund expenditures on the acquisition and protection of lands with the greatest western Joshua tree conservation value. CDFW will update or revise this tool as needed in the future based on new information and data.

### **MANAGEMENT ACTION LC&M 2: PROTECT PRIORITY CONSERVATION LANDS**

CDFW will apply a multifaceted approach to safeguard conservation lands supporting western Joshua trees on a local scale and within predicted climate refugia range-wide. Protection of areas identified as priority conservation lands is particularly important to achieve the goals of this Conservation Plan, but any lands supporting western Joshua tree may contribute to the conservation of the species. Strategies for land conservation may include designations by state, federal, local, and tribal governments (e.g., designated parks, preserves, monuments, conservation areas, and wilderness areas); protection of lands for conservation by NGOs; acquisition of fee title or conservation easement; and implementation of interagency agreements or written memoranda of understanding (MOUs). Durable legal protection mechanisms are described further in Chapter 6, “Implementation.”

#### ***Action LC&M 2.1: Implement Priority Conservation Land Protection***

Lands identified through Management Action LC&M 1, “Identify Priority Conservation Lands,” as high priority for western Joshua tree conservation could be protected through the following implementation approaches:

- Establishment of a State Parks Natural Reserve or Natural Preserve within a State Park or State Recreation Area, CDFW Ecological Reserve, and conserved land under state conservancies or Resource Conservation District land protection programs.
- Purchase or lease of State School Lands from the California State Lands Commission for western Joshua tree conservation purposes.
- Conservation of other state lands through written MOUs or other collaboration agreements with CDFW.
- Designation of national monuments, federal conservation areas, wilderness areas, national parks, and other federal protections.
- Conservation of other federal lands through interagency agreements or written memoranda of understanding and other mechanisms in coordination with US Fish and Wildlife Service (USFWS) (see example agreements in Section 2.2.2, “Federal Listing Status”).





- Acquisition of land by governments, Tribes, or NGOs from willing sellers through fee title or conservation easement acquisition.
- Establishment of conservation easements cooperatively by landowners.
- Written MOUs for conservation on tribal land.
- Establishment and protection of public open space, parks, or/and preserves by local agencies.

### **Action LC&M 2.2: Track Progress of Conserved Lands**

Regardless of the land protection approaches used, a central tracking system for conserved lands should be maintained by CDFW to track progress in protecting priority conservation lands. The system should use a geographic information system to document locations of protected lands in relation to western Joshua tree's distribution and priority conservation lands identified under Management Action LC&M 1, "Identify Priority Conservation Lands."

### **MANAGEMENT ACTION LC&M 3: MANAGE CONSERVATION LANDS**

Long-term management of conservation lands should be carried out to support western Joshua tree populations and habitat. Land management activities, such as invasive species control, fuel break maintenance, fence repair, garbage removal, monitoring and adaptive management, and law enforcement, are often required to avoid, minimize, and remediate ongoing and persistent threats. Land management is particularly important for priority conservation lands at high risk from wildland fire, invasive species, ongoing and adjacent land use, and illegal or trespass activities. Land management is an important action for maintaining the natural processes western Joshua tree needs in its habitat. TEK would help define beneficial land management practices for western Joshua tree, as discussed in Section 5.2.3, below.



Source: Anna Cirimele, National Park Service.





Management of federal and state lands is typically the responsibility of an agency, with resources allocated based on the budget and priorities of the agency in compliance with its laws and regulations. Although some agencies allocate resources with biodiversity conservation in mind, land use policies or mandates may conflict with conservation priorities and can negatively affect biodiversity. Even if conservation is a priority, agency resources may be limited to implement land management for the benefit of western Joshua tree.

### ***Action LC&M 3.1: Develop Long-Term Plan for Conservation Lands***

Landowners, land managers, and agencies should develop management and long-term monitoring plans to promote long-term persistence of western Joshua tree on conservation lands. These plans should describe how the land will be managed to maintain habitat function and minimize or remediate threats to western Joshua tree. CDFW will work with land managers to develop long-term monitoring and management plans or conservation easement stewardship agreements for conserved lands.

Land management plans should be tailored to the needs of individual properties based on site evaluations. Management priorities may include invasive species control, wildland fire risk reduction, cultural burning, restoring degraded areas, and measures to reduce threats from adjacent land uses or to prevent trespassing and unauthorized uses. Monitoring for adaptive management should be incorporated into plans to track the condition of western Joshua trees and other habitat characteristics. Management actions or alternative management approaches should then be implemented, if necessary, based on monitoring results.

Management should emphasize protecting priority conservation lands from wildland fire where fire risk to western Joshua tree populations is high. Maintenance of existing fuel breaks and establishment of new low-impact fuel breaks may be effective approaches to protecting western Joshua tree populations from wildland fire damage. Existing roads and other infrastructure should be maintained as fuel breaks to the extent feasible and effective.

### ***Action LC&M 3.2: Prioritize Management of State and Federal Lands for Western Joshua Tree***

Approximately 2 and 63 percent of the western Joshua tree range in California are on state and federal lands, respectively. Therefore, CDFW will seek to establish written MOUs or other written agreements with state and federal agencies for long-term monitoring and management to benefit western Joshua tree on priority conservation lands. Approximately 28 percent of these lands are within predicted climate refugia, which increases the importance of managing these lands to conserve western Joshua tree.



**Action LC&M 3.3: Establish Endowments and Provide Other Long-Term Funding Mechanisms for Management of Conservation Lands**

Funding for long-term land management is necessary to ensure that critical monitoring and management activities of conservation lands are implemented. Funding may be provided with endowments, annual budgets, grants, use of the Conservation Fund, or other mechanisms applicable to the land management agency, organization, or California Native American tribe.

**MANAGEMENT ACTION LC&M 4: RESTORE AND ENHANCE HABITAT**

Restoration of damaged or degraded lands and enhancement of lands to help support western Joshua tree can aid in the conservation of the species. Given that desert ecosystems are slow to recover after disturbance, active restoration can be a valuable tool for increasing ecosystem recovery and improving habitat suitability for western Joshua tree (Abella et al. 2023).

Habitat restoration is the holistic process of reestablishing ecological function and repairing characteristics of a site to return it to a condition that is self-sustaining. Realizing self-sustaining habitat may be achieved under the care of Tribes and/or by aiming to re-create conditions that existed before it was damaged or degraded by natural or human disturbances post-colonization. Restoration actions may include reconstructing natural topography or other physical characteristics of the land, rehabilitating compacted soils, removing invasive plants, and replanting native vegetation. Examples of habitat restoration include replanting western Joshua trees and associated native plants on a site where these species were destroyed by wildland fire and reestablishing natural topography where OHV use created rills and gullies (Abella et al. 2023). In some circumstances, restoring moderately or highly degraded lands occupied by western Joshua tree can provide conservation value for the species overall. Restoration is especially valuable where ecologically core or ecologically intact lands are not available, or where degraded or converted lands are within or connected to predicted climate refugia.

Habitat enhancement involves the modification of certain characteristics of a site with the goal of increasing specific habitat functions based on management objectives, such as increasing habitat suitability for a particular species (Vaughn et al. 2010). An example of habitat enhancement is vertical mulching a site occupied by western Joshua tree that is lacking sufficient nurse plants to support western Joshua tree recruitment. Another example is implementing projects that use science-based, assisted gene flow methods to introduce climate-adapted genes into stands of western Joshua trees to enhance their capacity for climate adaptation and resilience, provided there is sufficient scientific justification to do so. Habitat enhancement may be appropriate on some ecologically core or ecologically intact conservation lands, such as those that are within predicted climate refugia. Enhancement may also be beneficial on sites that support populations with advantageous genetic traits,



such as climate resilience adaptations, to increase seed production or recruitment within those populations.

Land managers should use a comprehensive restoration approach to return ecosystem functions to degraded sites, or to enhance a site's resilience, ecological function, and ability to recruit western Joshua trees. Where appropriate, funds from the Western Joshua Tree Conservation Fund could be used for restoration efforts on strategically located habitats that have been degraded by fire, invasive plants, development, grazing, unauthorized OHV use, or other disturbances.

### **Action LC&M 4.1 Identify Priority Restoration Areas**

Western Joshua tree habitat of high conservation value that is damaged by wildland fire or other stressors should have priority for restoration. Habitat of high conservation value includes sites within or connected to predicted climate refugia and other priority conservation areas as determined through implementation of Management Action LC&M 1, "Identify Priority Conservation Lands." Other priority restoration sites should be selected based on predicted climate refugia areas where research indicates climate-adapted individuals are already found growing. Other factors to consider when evaluating lands for restoration potential include adjacent land uses, western Joshua tree cover and demography, seed sources or presence of a seedbank, soil condition, absence of invasive plant infestation, condition of topsoil, presence of biotic soil crusts, and availability of nurse plants.

### **Action LC&M 4.2 Identify Priority Enhancement Areas**

Enhancement should be implemented to improve ecosystem processes on sites already occupied by western Joshua tree to increase recruitment and population resilience. Enhancement projects would be focused on relatively undisturbed areas to ecologically improve western Joshua tree habitats on priority conservation lands. Enhancement activities should be focused on sites that are situated in predicted climate refugia or other priority conservation areas where natural processes or habitat functions could be improved for a specific conservation objective, and where enhancement projects will clearly result in an overall net improvement in ecosystem processes for western Joshua tree and its habitat. The following are examples of enhancement for conservation objectives:

- Assist the natural regeneration of western Joshua trees and nurse plants.
- Introduce climate-adapted genes in populations through assisted gene flow methods, such as translocating individuals and outplanting nursery stock.
- Irrigate during drought periods.
- Improve regeneration by introducing yucca moth pollinators.



### Action LC&M 4.3: Develop and Implement Restoration/Enhancement Plans

Once a site is identified for a restoration or enhancement project, a detailed design plan for implementing the project should be developed. The design plan should incorporate clear, explicit, and measurable goals based on current baseline potential and site conditions before disturbance. The design plan should include a summary of the site's existing habitat conditions, a description of habitat features required for western Joshua tree persistence, quantitative metrics to define goals and measure success, a monitoring and management plan, an undisturbed reference site to compare with the restoration or enhancement site to help evaluate success, an estimate of the project's cost, and review of the design plan by a qualified desert restoration specialist.



Joshua tree habitat restoration site managed by Mojave Desert Land Trust.

Source: Jessie Quinn, Ascent

The steps to implementing enhancement activities should be site specific depending on management goals; however, any potential restoration action on a disturbed site could likely be implemented on a relatively undisturbed site to improve natural processes, habitat functions, or climate resiliency for western Joshua tree.

Typical restoration or enhancement goals for western Joshua tree habitat include increasing western Joshua tree recruitment; increasing cover of native plant species, especially native shrubs; reducing competition from invasive annual plant cover; and stabilizing and repairing soils including soil microbiomes (biocrusts). Typical challenges to achieving restoration or enhancement goals in desert ecosystems include low and unpredictable precipitation; hot, dry summers; infertile, shallow, or damaged soils; intensive herbivory when other forage plants are limited; limited availability of plant resources for revegetating restoration sites; and competition from invasive plants (Abella et al. 2023). The restoration or enhancement design plan should identify methods to address these challenges.

Modified and disturbed habitats often have little or no remaining cover of live western Joshua trees and native associate plants and therefore require active planting as an element of restoration. These sites must be revegetated with western Joshua tree and nurse plant species. Depending on the needs of the site, availability of plant and seed sources, and funding availability, revegetation may use a combination of these methods: outplanting appropriate



nursery stock, salvaging and transplanting from other sites, planting cuttings from plants, and seeding. Ideally, this would include planting western Joshua tree seedlings grown from seeds that are collected from individuals genetically adapted to similar site conditions, from the same general geography, and from individuals with climate adaptive traits. Where necessary and feasible for vegetation establishment, all plantings of western Joshua tree and nurse plants should be caged to prevent damage from herbivory, and supplemental irrigation should be provided. Assisted natural regeneration of western Joshua trees and nurse plants may be an appropriate element of restoration to promote their growth and establishment, which might include tree shelters, removal of competing invasive vegetation, and other techniques based on science including TEK.

Disturbed lands often have degraded soils and may require soil rehabilitation before revegetation. Soil conditions should be evaluated before beginning revegetation, and a strategy for improving soil suitability for western Joshua tree establishment should be incorporated into the restoration design plan as necessary. Soil rehabilitation techniques may include decompaction, roughening soil surfaces, replacing topsoil, and inoculating soil with associated beneficial microorganisms (e.g., arbuscular mycorrhizal fungi).

Active restoration of biotic soil crusts (biocrusts) can be an important part of returning degraded sites to conditions favorable for western Joshua tree by limiting soil erosion, increasing soil organic matter and nutrients, facilitating native plant seed germination, and limiting invasive plant establishment. Arbuscular mycorrhizal fungi live in the soil and form mutualistic symbiosis with plant roots that facilitate nutrients to roots, increase drought tolerance by increasing water uptake in roots, and may increase resistance to soil pathogens. As new research improves understanding of biocrust restoration and arbuscular mycorrhizal fungi associations with western Joshua tree, strategies in restoration plans should be updated and refined.

Vertical mulching consists of placing dead plant material upright into the ground to provide vertical structure that replicates some functions provided by nurse plants, such as shading, trapping windblown sand and seeds, and moisture retention. If appropriate for the site, this technique can be implemented to reduce erosion, discourage vehicle or foot traffic, and facilitate the establishment of western Joshua tree and native shrub seedlings (Abella et al. 2023).

Climate change is predicted to make the region hotter for longer periods of the year and increase the occurrence of droughts, variable precipitation, and intensity of heavy precipitation events; therefore, reducing as many other threats and stressors as possible will increase the likelihood of restoration success (Abella et al. 2023). Anything that degrades the habitat value for western Joshua tree, such as invasive plants, incompatible land uses (e.g., livestock grazing, OHV use), erosion, and wildland fire (e.g., fuel breaks around the restoration site) should be addressed through the restoration design. If appropriate and feasible,





restoration sites should be fenced to prevent human activities (e.g., foot traffic, OHV use, cattle grazing, illegal dumping) from influencing restoration success.

Restoration or enhancement activities should include conducting an invasive species assessment of the site, including mapping infestations. Then, if appropriate, invasive species control should be conducted, using targeted herbicides (e.g., indaziflam) or other treatment methods appropriate for target species, early in the growing season before restoration occurs, as well as for maintenance (see Action A&M 2.6, "Minimize Impacts during Pesticide Application").

Yucca moths play a critical role in western Joshua tree reproduction; therefore, introducing yucca moth pollinators to restoration or enhancement sites where they are absent should be considered as part of a restoration or enhancement design plan and incorporated as appropriate to facilitate pollination and contribute to successful regeneration. Ongoing monitoring to track moth survival and reproduction and management to protect moths from threats would be necessary for successful establishment of a self-sustaining yucca moth population.



*Source: Anna Cirimele, National Park Service.*

Regular maintenance and monitoring are necessary to ensure ecological processes are trending toward meeting the goals described in the design plans. Monitoring allows projects to be adaptively managed if performance standards are not being met along the way. Quantitative performance criteria that trigger adaptive management actions if performance standards are not being met should be incorporated into the maintenance and monitoring plan. Monitoring duration and intervals should be included in the plan. Restoration and enhancement projects should be monitored for long periods of time following completion of the initial restoration or enhancement activities due to the slow nature of desert ecosystem



processes. Monitoring, maintenance, and adaptive management should continue until success criteria are met.

**Action LC&M 4.4: Encourage Project-Related Revegetation and Restoration to Minimize and Mitigate Impacts**

Project proponents (i.e., private and public entities) should be encouraged to include a revegetation and/or restoration component in their projects, especially when avoidance and relocation are not feasible, to further restore and enhance habitat. Revegetation and/or restoration undertaken pursuant to an existing statutory scheme requiring success criteria, monitoring, and financial assurances to ensure completion of the revegetation and/or restoration can satisfy this management action.

**MANAGEMENT ACTION LC&M 5: DEVELOP AND IMPLEMENT A SEED CONSERVATION STRATEGY**

While preserving western Joshua tree in the wild is the top priority, developing a seed conservation strategy that includes establishment of seed banks is an important way to minimize loss of western Joshua tree genetic diversity over the long term (see Action A&M 2.4). Seeds collected for long-term conservation storage could be used to grow western Joshua trees for restoration and enhancement projects or research. With sufficient additional research, the conservation seed bank could provide opportunities to assist gene flow to facilitate climate adaptation by planting western Joshua trees in areas of climate refugia.

A comprehensive seed conservation strategy should be implemented to develop a seed repository that is representative of western Joshua tree genetic diversity over a wide geographic area across a range of environmental conditions. The seed strategy should include protocols for seed collection, storage, and distribution for conservation and recovery purposes following the guidelines published in Center for Plant Conservation's *CPC Best Conservation Practices to Support Species Survival in the Wild* (CPC 2019) that will ensure long term preservation of a viable, genetically diverse western Joshua tree population.

**Action LC&M 5.1: Develop Seed Collection Standards and Protocols**



Western Joshua Tree Conservation Plan

In collaboration with other agencies and institutions, CDFW will develop and adopt standards and protocols for western Joshua tree seed collection strategies to maximize genetic seed diversity. The seed collection standards and protocols will be designed to conserve western Joshua seeds that are adapted to climates expected to persist in the



*Joshua tree seed pods.*

*Source: Anna Cirimele, National Park Service.*

future. Collections will include seeds from areas at high risk of wildland fire, areas recently subjected to wildland fire, and areas with hotter, drier microclimates (i.e., seeds from

genetically adaptive individuals). This would likely include collection of seeds during mast years. Seed collection could also be a permit condition for take of western Joshua tree (see Action A&M 2.4). The seed collection standards will be based on the Center for Plant Conservation's *CPC Best Conservation Practices to Support Species Survival in the Wild* (CPC 2019) and will include the following actions:



- Obtain necessary permits from CDFW and permission from the landowner before attempting any collection of western Joshua tree seeds.
- Collect no more than 10 percent of seeds produced within a given western Joshua tree population in any 1 year, or no more than the maximum amount of seeds allowed by CDFW and/or the relevant permitting authority.
- Capture the full genetic diversity of the population by collecting from individuals across the whole site, from as many maternal plants as possible, and from all sizes of seed-producing plants present. Collect seeds over multiple years, if possible, to increase genetic diversity of seeds collected.
- Collect only mature seeds and collect the full diversity of seed morphologies represented in the population.
- Track seed origin, or georeferenced latitude and longitude, of the parent plant from which the seeds were collected. Seed origin is important because genetic material and adaptations of seeds can vary widely between different locations. Offspring from seeds collected in a specific geography may not be genetically adapted for growth under environmental conditions in another location. Therefore, tracking their origin can help identify the geographic range suitable for growing the seed, increasing the odds of successful growth.
- Record accession information for seed collections, such as collector, date, location, habitat and associate species information, population demographics, and number of individuals from which seeds were collected.

### ***Action LC&M 5.2: Develop Seed Storage Standards and Protocols***

Stored seed will be important for use in ecological restoration/reforestation projects and assisted gene flow programs. Assisted gene flow programs could be used to enhance climate change resilience by translocating genetically adaptive individuals into western Joshua tree populations that do not currently support individuals with climate change adaptations. Seed viability and germination testing should be conducted prior to being put into storage and then retested for viability at regular intervals and before seeds are used to grow trees. Seeds should be stored following practices that promote high seed quality and increase seed longevity, as discussed in CPC (2019), such as:

- Keep accurate records, including documentation and accession information.
- Clean seeds prior to storage.
- Follow the recommended drying conditions.
- Package seeds from different maternal lines separately.





- Divide collected seeds into two batches and store at separate storage institutions to mitigate loss from natural or human-caused catastrophe.
- Adhere to the appropriate moisture targets to maintain relative humidity during storage.
- Store at the appropriate temperature.
- Monitor storage conditions and seed viability.

### **Action LC&M 5.3: Develop Nursery Standards and Protocols**

Nurseries used to grow seedlings should be qualified and abide by established standards and protocols. When western Joshua tree plants are required for restoration projects or assisted gene flow attempts, viable seeds from the repositories should be grown in a qualified nursery until seedlings have established to a point where they have a greater chance of survival in the wild. Standards should include guidance on plant and seed distribution and tracking, how long juvenile plants should grow in the nursery before they are ready for outplanting, proper soil mixtures, watering schedules, recommended pot sizes, and how seedlings should be transported to identified restoration and outplanting sites. CDFW may develop nursery standards and protocols for western Joshua tree propagation and outplanting and include them in a future Conservation Plan update, if necessary.

### **5.2.3 Tribal Co-Management**

CDFW recognizes that California's Native American tribes have long taken care of California's fish, wildlife, and plants and possess unique and valuable expert knowledge and practices for conserving and using these resources in a sustainable manner. Engaging in co-management is key for western Joshua tree conservation, and it is important to do so in ways that respect the interests and priorities of Tribes. The goal of co-management is to collaboratively share management functions and responsibilities for conservation of western Joshua tree and its habitat. Co-management provides an avenue to improve the conservation strategies by ensuring Tribes have access and pathways to implement their extensive life experience and unique understanding of the landscape. This also ensures their knowledge is incorporated into the Conservation Plan, as appropriate, while acknowledging that the Tribes choose what and how knowledge is shared.



Source: Native American Land Conservancy.





The process to develop meaningful co-management will require time that extends beyond the publishing timeline of the Conservation Plan. TEK shared by Tribes will influence management actions in the Conservation Plan. In turn, this tribal knowledge and guidance will inform specific standards for co-management of the species. The actions in this section describe establishing the framework needed to guide development, incorporation, and implementation of co-management functions and responsibilities.

### MANAGEMENT ACTION TCM 1: ESTABLISH CO-MANAGEMENT PRINCIPLES

Collaboratively establishing core principles of co-management is an essential first step toward co-creating written agreements and long-term collaborations between the State and Tribes for western Joshua tree conservation. The goal of developing co-management principles is to guide future decision making and the elements of co-management practices between CDFW and Tribes. These core principles may include expectations and use of vocabulary that signifies the respect, commitment, intent, and responsibilities of multiple sovereign governments and integrate their respective management philosophies into mutually beneficial approaches to achieve a common set of goals. It is important that the co-management principles reflect tribal interests and priorities that complement other actions designed to implement WJTCA and to comply with other California laws. Therefore, development of co-management principles requires time and multiple discussions to achieve an approach and written agreement that works for both CDFW and Tribes. This will warrant ongoing work together after the initial adoption of the Conservation Plan.

After reviewing the Advisory Council on Historic Preservation's Policy Statement on Indigenous Knowledge and Historic Preservation (ACHP 2024), CDFW developed initial foundational commitments, which was requested by tribal members (FII CPI, pers. comm., 2024a). A draft of CDFW's foundational commitments is provided in Appendix G, "Foundational Commitments by CDFW for Developing Western Joshua Tree Conservation Plan Co-Management Principles with California Native American Tribes." The following topic summaries are addressed in the commitments:

- **Respect and relationship building.** Tribal knowledge, including TEK, will be treated with respect in all circumstances.
- **Valid and self-supporting knowledge.** TEK held by a tribe is a valid, sound, and self-supporting source of information and is an aspect of science.
- **Cultural and religious significance of Traditional Ecological Knowledge.** Conservation actions affect resources and properties that may be of religious and cultural significance to tribes.



- **Fair compensation.** If a state agency requests a tribe to provide TEK via research, survey, monitoring, or other efforts, the state agency and the tribe are encouraged to collaborate to identify potential funding mechanisms (which may include grants, to the extent permitted by applicable laws and regulations and sufficient resources) to fairly reimburse or compensate the tribe.
- **Transparency and records of tribal involvement.** Maximum transparency is essential to demonstrate how and what tribal priorities, including TEK and other sensitive information, will be documented in conservation project records.
- **Consultation timelines.** Timelines will reflect the complexity and nature of the undertaking and will recognize and seek to accommodate to the capacity of tribes throughout the decision-making processes.
- **Professional qualifications of tribal representatives.** The State recognizes that representatives of tribes have professional qualifications.
- **Managing and protecting sensitive tribal information.** The State will prevent or limit to the maximum extent feasible any inappropriate disclosure of confidential or sensitive information through all available mechanisms.



Source: Jessie Quinn, Ascent.



## **MANAGEMENT ACTION TCM 2: MUTUALLY DEFINE ELEMENTS OF CO-MANAGEMENT**

Guided by the foundational commitments and co-management principles from Management Action TCM 1, “Establish Co-Management Principles,” CDFW and California Native American tribes will co-create elements of the Western Joshua Tree Conservation Plan actions that incorporate tribal values, knowledge, priorities, and co-management on tribal land or other properties that contain resources or lands that may be of religious and cultural significance to Tribes. Mutually defining elements that should be included in co-management agreements to carry out both traditional and contemporary land stewardship practices promote meaningful collaboration and tangible outcomes. The following actions present elements that need to be addressed and agreed upon with Tribes for inclusion as co-managed conservation actions:

- Articulate a process for take of western Joshua tree by California Native American tribes in a culturally appropriate manner or for a specific purpose (FII CPI, pers. comm., 2024a).
- Continue consultation to provide a platform for Tribes to articulate aspects of TEK that include spiritual and cultural elements that may be new to agencies. Agencies should seek to consider these unfamiliar aspects of environmental protection and include them in guidance and policies (FII CPI, pers. comm., 2024b).
- Upon request of a California Native American tribe, collaborate on developing a process to relocate western Joshua trees to tribal lands when there is an opportunity to do so. For example, an opportunity may be related to coordinating with a developer that is openly seeking a pathway for relocating trees they are permitted to take.
- Encourage the presence of tribal cultural monitors at development or other ground-disturbing projects during the salvage, destruction, or removal of western Joshua trees as a measure to provide spiritual and cultural protection to western Joshua trees that are either taken or are affected in the project area. Ideally, tribal cultural monitors may also be trained as arborists working as desert native plant specialists to ensure proper salvaging methods are implemented (FII CPI, pers. comm., 2024b).
- Encourage employment of trained tribal members or local tribal conservation crews to support restoration and relocation efforts of western Joshua trees that are carried out with cultural and biological integrity.
- Collaborate with Tribes to identify where ethnographic studies are requested. Identify needs and potential resources, including but not limited to funding, so Tribes can carry out these studies.
- Identify priority lands of significance to individual California Native American tribes that may overlap with the biological criteria outlined in Management Action LC&M 1 so that they can be prioritized for long-term conservation and tribal stewardship.



- Collaborate and identify initiatives for tribal management of western Joshua trees, for example, supporting nurseries developed and led by California Native American tribes for western Joshua tree conservation.
- Incorporate California Native American tribes' TEK or provide supporting pathways for Tribes to implement TEK into western Joshua tree conservation strategies. For example, Tribes and CDFW will collaborate to incorporate cultural burning where it would be an effective tool (outlined under Management Action LC&M 3) for reduction of wildland fire risk or enhancement of western Joshua tree population conditions on tribal lands (ACTCI, pers. comm., 2024).
- Collaborate and identify all applicable and available sources of funding (including but not limited to the use of the Conservation Fund) to support tribal TEK implementation. Non-tribal parties assuming TEK implementation responsibility without explicit tribal permission would be a breach of intellectual property use and would be an extractive practice toward the California Native American tribes (FTBML, pers. comm., 2024).
- Develop written MOUs or other written collaboration agreements between CDFW, California Native American tribes, and relevant entities that would embody co-management principles (see Section 6.4, "Tribal Co-Management").

## 5.2.4 Research to Inform Long-Term Conservation

The scientific understanding of the long-term persistence of western Joshua tree is evolving as research continues. It is currently difficult to determine what ecological factors are influencing long-term persistence. These difficulties are centered around a lack of range-wide demographic data and the amount and frequency of recruitment necessary to maintain populations, uncertainty about the magnitude and timing of heat and drought stressors and how western Joshua tree will respond, and lack of information about the environmental tolerances and population dynamics of yucca moth (USFWS 2023). Therefore, additional research is necessary to fill these information gaps.

### MANAGEMENT ACTION R&I 1: CONTINUE RESEARCH AND INFORMATION DEVELOPMENT

CDFW will encourage scientific research needed to inform effective conservation of western Joshua tree. There are currently numerous information gaps related to species genetics, distinct populations, demography, distribution, microbial associations, fire effects, climate response, and other factors that will be important to the conservation and management of western Joshua tree. Science and research are fundamental to long-term species conservation and for developing meaningful strategies to avoid, minimize, and mitigate threats to western Joshua tree. The seven-step approach recommended by Smith et al. (2023) for effective species





conservation in the face of climate change requires acquisition of information that is currently lacking for western Joshua tree. Research also provides a foundation from which to track the success of conservation and management actions and adapt management strategies as needed if monitoring indicates performance targets are not being met.

### ***Action R&I 1.1: Identify Genetic Structure and Distinct Populations***

Research focused on genetic studies is needed for western Joshua tree conservation. Preserving a species' full range of genetic variation is one of the pillars of conservation biology. Understanding the range of western Joshua tree's genetic variation is needed to inform effective conservation. Specifically, genomic research is needed following these steps, which are outlined in Smith et al. (2023):

- Quantify neutral diversity (i.e., genetic variation that is not affected by natural selection).
- Delineate genetically distinct populations.
- Identify climate-adaptive variants.
- Catalog adaptive diversity (i.e., range of adaptive traits that make individuals better suited to withstand the effects of climate change and other stressors).

### ***Action R&I 1.2: Collect and Analyze Range-Wide Demographic Information***

Develop a program of long-term, range-wide direct population and vegetation monitoring with emphasis on leading and trailing edges, and highest and lowest elevations of the species' range in California. Range-wide demographic information is needed to detect baseline population trends, and identify populations with high recruitment (i.e., addition of new adult plants that develop from seeds or sprouts) and those that do not appear to be recruiting/reproducing new individuals onsite at sustainable levels (i.e., plants are not reproducing at a sufficient rate to replace themselves generation after generation). Researchers should look for collaboration opportunities to develop standardized monitoring protocols to collect demographic data and abundance trends across the species' range, and to establish and maintain a database for data collected.

### ***Action R&I 1.3: Develop Refined Species Distribution Models***

Once genetically distinct populations have been delineated, research should use these data to develop refined species distribution models to help identify habitat suitable for western Joshua tree in the future (Smith et al. 2023). Potential refugia models should be validated with range-wide demographic data collection and other independent data sources (Smith et al. 2023).





**Action R&I 1.4: Assess Adaptive Genetic Variation**

Research should evaluate climate adaptive genomics. Once genetic variation of the species is better understood, researchers should identify subpopulations with adaptive traits that make them better suited to withstand the effects of climate change. Researchers should consider genome-wide association studies, as recommended by Smith et al. (2023), to identify adaptive genes responsible for greater tolerances to heat, drought, and other stressors. Genotypes (genome sequence data) of individuals that survive climate extremes and from populations with greater numbers of individuals with these adaptive traits should be prioritized for conservation and used for assisted gene flow (i.e., relocating genetically adaptive individuals or their propagules to areas already occupied by western Joshua tree to facilitate climate change adaptation).

**Action R&I 1.5: Study Yucca Moth**

Research should investigate the western Joshua tree's obligate pollinator, yucca moth's life history, environmental tolerances, distribution, local adaptation to host plant populations, and association genetics or other approaches to identifying adaptive genetic variation (see "Pollination" in Section 4.1.3, "Life History"). Researchers should produce range-wide species distribution models for yucca moth; determine the percentage of larvae in diapause that are lost to predation and other factors, such as project-related impacts; and study the cues that trigger metamorphosis.

**Action R&I 1.6: Update Ecoregional Assessment**

Update previous work done by Randell et al. (2010) and Parker et al. (2018) or other datasets to assess ecological intactness within the entirety of western Joshua tree's range.

**Action R&I 1.7: Research Microbial Associations and Restoration Techniques**

Research should investigate biocrust associations and arbuscular fungi associations and their role in western Joshua tree conservation, as well as other microbial associations that may be important to western Joshua tree survival. Research should include techniques to restore biocrusts and fungi associations important to western Joshua tree, such as biocrust salvage and transplantation in the wild, and propagation and inoculation techniques in nursery settings. Biocrusts could also be applied to fuel breaks to reduce exposed soil and limit invasive plant establishment while maintaining effective fuel breaks (Condon et al. 2023).

**Action R&I 1.8: Investigate Fire Resilience/Postfire Recovery**

Research should investigate fire resiliency of western Joshua tree and its nurse plants. Studies could include postfire monitoring of western Joshua tree recruitment, seed production of trees that survive, or basal sprouting. Sweet et al. (2023) suggests monitoring could include collecting baseline data in nurse plant cover at burned sites and following recruitment



patterns. Research should also investigate fire regime-plant community interactions, including the positive feedback loop invasive plants can have on promoting recurrent fire in western Joshua tree habitat (Brooks and Matchett 2006). This research should consider impacts of annual rainfall amounts to inform when invasive plant control is needed to protect western Joshua tree populations (Brooks and Matchett 2006).

### **Action R&I 1.9: Investigate Invasive Plant Control Techniques**

Research should investigate the most effective ways to control the spread and abundance of invasive plant species to reduce fire risk through the following possible activities:

- Identify the most effective treatment strategies to manage invasive species that optimize benefits while minimizing negative tradeoffs under a range of conditions (Abella et al 2023; Reed et al. 2009; Darst et al. 2013; Tuma et al. 2016).
- Investigate indirect effects of herbicide application (e.g., indaziflam) in western Joshua tree habitats, particularly on western Joshua tree seedlings and nurse plants, as well as other native plants. Using this information, identify demographic effects and appropriate avoidance buffer standards and application methods for herbicide use in areas occupied by western Joshua tree (Abella et al 2023).

### **Action R&I 1.10: Research Long-Term Climate Effects**

Research should investigate the effects of multiyear and multidecade climate variability patterns on western Joshua tree recruitment, survival, and population density. Research should aid the development of a large-scale demographic study that is needed to inform conservation acquisitions and other forms of protection.

### **Action R&I 1.11: Study Salvage and Relocation Methods**

Evaluate and improve salvage and relocation methods to increase survival of western Joshua trees salvaged from development sites and transplanted to mitigation sites. Successful relocation can increase the persistence of western Joshua tree and ensure genetic diversity and adaptive variation are retained from populations lost to development.



Source: Drew Kaiser, California Department of Fish and Wildlife.



**Action R&I 1.12: Investigate Assisted Migration**

Research the feasibility, practicality, effectiveness, and risks of implementing future assisted migration and translocation into areas modeled as climate refugia to which western Joshua tree cannot naturally migrate (Figure 5-2) (Shryock et al. forthcoming). This information would be used to inform the usefulness of conserving lands that are outside the current range of western Joshua tree but that may become suitable for the species in the future under different climate scenarios. Western Joshua trees have low capacity to colonize newly available areas on their own because of their low dispersal ability and limited connectivity between currently occupied and potential future habitat. Assisted migration is frequently contemplated as a conservation tool to get species to newly available habitat; however, further study is needed to determine how this can be done successfully, cost effectively, and without adverse effects to the receiving ecosystems (Smith et al. 2023).

**Action R&I 1.13: Study Basal Sprout Survival and Vulnerabilities**

Research the resource needs (e.g., nutrients, water) and vulnerability of basal resprouts of western Joshua tree to increase persistence, for example, whether they may be vulnerable to drought or herbivory. Further study could include an analysis of survival data based on various environmental and biological factors and may include unburned reference sites for estimating background mortality. Analysis of these data is ongoing pending further funding support (Sweet et al. 2023). These data will enhance understanding of demographic trends. Research should help inform potential site-specific management needed to ensure growth and survival of individual western Joshua trees.

**Action R&I 1.14: Tribal Ethnobotanical Studies**

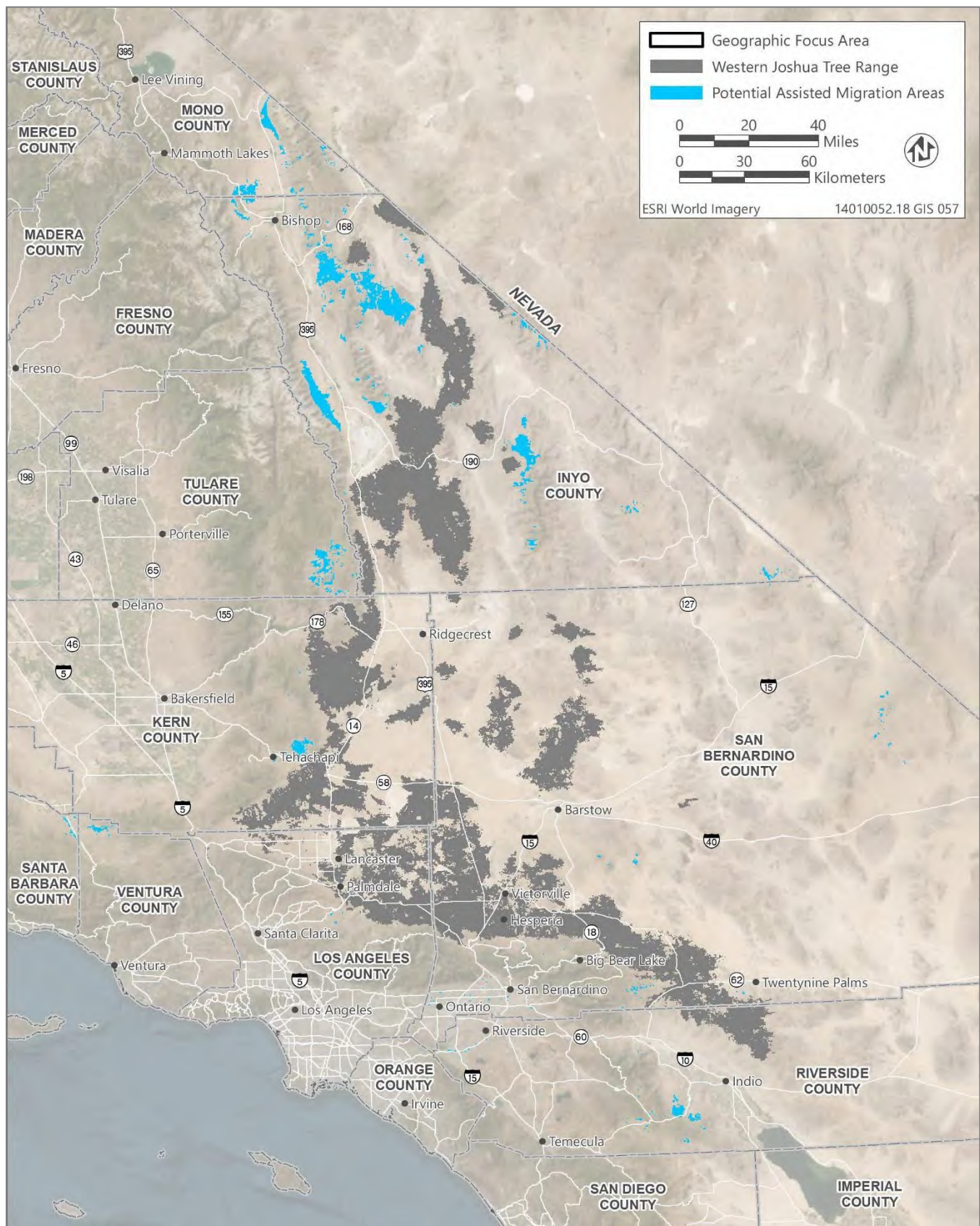
Ethnobotanical studies of the greater Mojave Desert and Great Basin regions and western Joshua tree habitat should be conducted if requested by a California Native American tribe. Ethnobotanical studies research how people of a particular culture and region use native plants for food, medicine, shelter, dyes, fibers, oils, resins, soaps, waxes, ceremonial purposes, and more (USFS 2024).

**Action R&I 1.15: Develop Additional Fuel Treatment Methods**

CDFW will coordinate with California Department of Forestry and Fire Protection (CAL FIRE) and others on developing additional fuel treatment methods for western Joshua tree habitat, including manual and mechanical treatment methods. Once developed, these treatment methods could eventually be included in the minimization measures in Section 5.2.1, above.







**Figure 5-2 Potential Assisted Migration Areas**



## 5.2.5 Education and Awareness

Education and awareness programs will enhance public understanding of western Joshua tree ecology, foster community pride and ownership of western Joshua tree conservation, connect people with their natural world, and inspire people to care about western Joshua tree and its habitat so they will support conservation of the species. A key priority will be ensuring that underserved and overburdened communities have access to—and can engage in—education and awareness programs and opportunities.

### MANAGEMENT ACTION E&A 1: SUPPORT EDUCATION AND OUTREACH

Education and outreach programs that increase awareness and appreciation of the cultural, biological, and ecological value of western Joshua tree may provide long-term benefits for conservation of the species. Education and outreach programs can also promote opportunities for all communities to be involved with western Joshua tree appreciation, stewardship, and conservation.

#### ***Action E&A 1.1: Support Tribal-Led Educational Outcomes***

CDFW will work with Tribes to support tribal priorities for education and outreach to their communities. The following are examples of undertakings or materials that may be developed to support tribal-led and tribal-designed efforts:

- ethnobotanical studies,
- lesson plans and curricula for various age groups,
- professional certification programs (e.g., for tribal cultural monitors, TEK practitioners, fire and restoration specialists),
- printed materials designed to strengthen cultural knowledge, and
- workshops.

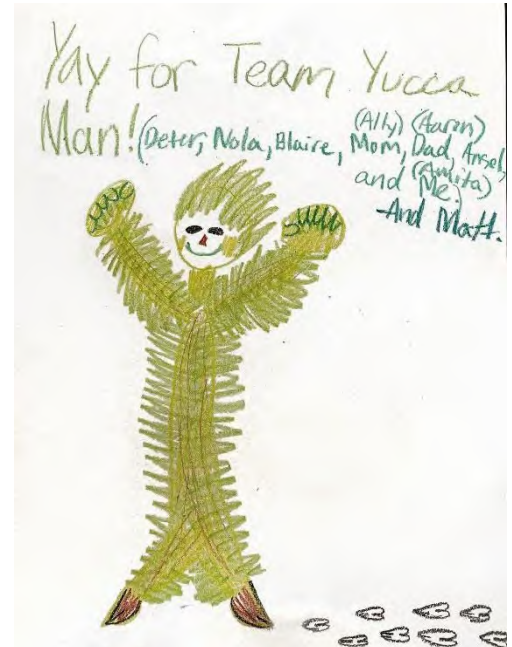
#### ***Action E&A 1.2: Develop Publicly Distributed Information***

CDFW will work with partners to develop accessible informational items for distribution to the public in multiple languages. The informational items may be handouts, brochures, presentations, digital materials, surveys, interactive web pages, or other outreach tools. Materials should be made available to communities throughout western Joshua tree's range in California with a dedicated focus on reaching underserved communities. Informational items may include the following materials:





- a handout describing how to care for western Joshua tree with information on:
  - watering (none unless they show signs of heat/drought stress),
  - invasive plant removal,
  - nurse plant species to incorporate into landscaping, and
  - signs of pests and solutions for pest infestations;
- science kits, handouts, and web-based western Joshua tree activities for schools to educate young citizens about western Joshua tree and its need for conservation such as:
  - coloring and activity sheets focused on western Joshua tree “fun facts” and biology;
  - a western Joshua tree junior ranger program based on collecting information about the species; and/or
  - a science kit developed in collaboration with local scientists and educators that includes hands-on activities through storytelling, art, or field trips, focusing on western Joshua tree and climate change impacts and solutions, such as a traveling trunk for Climate Kids with the Climate Science Alliance;
- materials and opportunities for the public to participate in western Joshua tree conservation efforts and education, such as:
  - a calendar of volunteer events (e.g., seed collection and restoration) and educational webinars,
  - iNaturalist citizen science project information, and/or
  - Information on recreating outdoors with western Joshua trees responsibly (see Action A&M 2.8, “Minimize Impacts from OHV Use and Outdoor Recreation”);
- collaborations to fund and open a western Joshua tree art gallery or exhibit that could be made available to the public within the geographic focus area of this Conservation Plan and virtually online; and/or
- interactive, web-based ArcGIS StoryMaps for western Joshua tree conservation and education.



Source: Amita Bubb.



**Action E&A 1.3: Establish a Tree Adoption Program**

CDFW will reach out to partners to encourage organizations to develop opportunities for an adopt-a-Joshua tree program. This program may include the following activities:

- establishing a program in which members of the public can “adopt” western Joshua trees salvaged from development sites and replant them on their private property, and/or
- providing signage that landowners can place on their property to identify “adopted” western Joshua trees.

**Action E&A 1.4: Explore Authorizing a Specialized Interest License Plate**

CDFW or other organizations may coordinate with the California Department of Motor Vehicles to develop a specialized western Joshua tree interest license plate. Monies generated from sales of the license plates could be added to the Conservation Fund.

**Action E&A 1.5: Support Media Promotion**

CDFW will coordinate with partner organizations to encourage development of newsletters and conduct western Joshua tree–focused social media campaigns.

**Action E&A 1.6: Support Volunteer Opportunities**

*Cattle sheltered by western Joshua trees.*

CDFW will support and encourage volunteer opportunities by promoting them on their website, social media, and printed media (e.g., handouts, newsletters). Special focus will be given to providing opportunities for underserved (i.e., communities that have historically received inadequate investment, resources, or services) and overburdened (i.e., communities that are disproportionately affected by pollution, environmental hazards, and health risks) communities and young

people to participate in and benefit from. This includes connecting these communities with natural areas containing iconic western Joshua trees.

The following volunteer programs may benefit western Joshua tree:

- National Park Service Volunteers-In-Parks (VIP) program,
- California State Parks Volunteer in Parks Program,
- Mojave Desert Land Trust volunteer programs,
- Transition Habitat Conservancy volunteer programs,



- CDFW-led seed collection/banking efforts,
- Yucca weevil tracking projects, such as Mojave Desert Land Trust's 2023 Yucca Weevil Watch hosted on iNaturalist, and
- western Joshua tree flowering/masting tracking projects hosted on iNaturalist.

#### **Action E&A 1.7: Develop Guidance for Grazing Practices**

CDFW will coordinate with agricultural organizations to encourage development of guidance regarding grazing best practices in western Joshua tree habitat and make it available to ranchers, rangeland managers, and others in the grazing community.

#### **Action E&A 1.8: Encourage Urban Conservation and Recovery**


CDFW will coordinate with local governments to encourage the development of educational materials for private residential and other property owners with western Joshua trees to participate in urban conservation and recovery efforts.

### **5.3 EFFECTIVENESS CRITERIA**

The management actions described in this chapter are necessary to achieve the vision, purpose, and objectives of the Conservation Plan. WJTC requires that the Conservation Plan include objective, measurable criteria to assess the effectiveness of management actions. This section presents preliminary effectiveness criteria to help CDFW and the Commission measure how effective the management actions are in conserving western Joshua tree. These criteria are divided into two sets. One set of criteria is related to the overall conservation of western Joshua tree in California, and the other set of criteria is related to the effectiveness of the Conservation Plan and the use of the Western Joshua Tree Conservation Fund in making progress toward the vision of this Conservation Plan. Although these two sets of criteria are interrelated, the former set is more relevant to the Commission's decision-making authority under the California Endangered Species Act (CESA), and the latter is more relevant for assessing the effectiveness of this Conservation Plan and the Western Joshua Tree Conservation Fund as implemented by CDFW.



### 5.3.1 Effectiveness Criteria for Conservation of Western Joshua Tree in California

- Global greenhouse gas emissions are reduced to a level that ensures the species is not at risk of extinction from climate change impacts in California. The measurable details of this criterion should be based on science and therefore may change as information improves on critical levels of greenhouse gases in the atmosphere for western Joshua tree survival.
- 
- Source: Anna Cirimele, National Park Service.*
- By 2033, when the Commission must reconsider whether listing western Joshua tree is warranted (Fish & G. Code, § 1927.9), 90 percent of land within the predicted climate refugia category under a low emissions scenario (SSP 2-4.5) that remains ecologically core, ecologically intact, or moderately degraded is permanently protected and managed to maximize ecological function for the species and its co-occurring native species. The measurable details of this criterion should be science-based and therefore may change as information improves on critical levels of greenhouse gases in the atmosphere for western Joshua tree survival. This criterion is also dependent on models of the predicted climate refugia category.
  - A large and genetically representative distribution of western Joshua tree is permanently protected and managed to maximize ecological function for the species, and its co-occurring native species. This criterion is dependent on science regarding western Joshua tree population genetics and on models of the predicted climate refugia category. The target for this criterion is 70 percent of priority conservation lands, as identified through Management Action LC&M 1, "Identify Priority Conservation Lands," across the full range of western Joshua tree in California by 2033.
  - Cooperative multiagency strategies are in place to reduce fire risk, aggressively fight wildland fires that threaten western Joshua trees, and fully fund restoration plans that will be implemented in response to wildland fires that kill a demographically significant number of western Joshua trees.
  - A program to monitor and assess western Joshua tree population status based on science has been developed and adopted, and assessments under this program demonstrate that western Joshua tree is sustainable in California for the foreseeable future.



### 5.3.2 Effectiveness Criteria for the Conservation Plan and the Western Joshua Tree Conservation Fund

- Initial draft priority conservation areas have been identified by December 2025.
- Every 2 years, beginning in 2026 (Fish & G. Code, § 1927.8, subd. (a)), the acreage of priority conservation lands preserved in perpetuity is greater than in the prior 2-year review period. CDFW will first focus on protecting priority conservation lands identified via Management Action LC&M 1, "Identify Priority Conservation Lands." CDFW will seek to protect an additional 3 to 5 percent of occupied western Joshua tree range every 2 years until the effectiveness criteria related to land protection for conservation of western Joshua tree in California are achieved.
- Conservation lands that are protected via the Conservation Fund have an endowment that is sufficient to fund management to maximize ecological function for the species and its co-occurring native species in perpetuity.
- At least one USFWS-approved written MOU or other written collaboration agreement has been established on federal land that protects and safeguards priority conservation lands representing at least 10 percent of occupied western Joshua tree range by 2033.
- At minimum, one written MOU or other written collaboration agreement incorporating co-management principles has been established between CDFW or other land managers and California Native American tribes by 2028.
- As measured every 2 years, more local jurisdictions have incorporated the Conservation Plan's A&M measures into adopted plans and policies.
- CDFW, local fire departments, CAL FIRE, and federal agencies have developed and implemented guidelines for avoiding direct impacts on western Joshua trees during wildland fire suppression and control activities, for fuel treatment implementation, and for preventing accidental ignition of fires during other activities, such as construction and recreation. Local fire departments in the geographic focus area, CAL FIRE, and federal agencies have entered into agreements with CDFW to implement the guidance. The number of jurisdictions implementing the guidelines increases every 2 years.

The preliminary criteria listed above are intended to help CDFW evaluate whether management actions are resulting in long-term conservation of the species. If they are not, it may be necessary to determine if and how the management actions should be modified or replaced.

As ongoing research develops metrics for demonstrating long-term persistence of western Joshua tree in California in the face of climate change, some effectiveness criteria may be modified or added when the Conservation Plan is reviewed and updated.





These initial effectiveness criteria help determine how successful implementing these important actions have been to conserve the species. These criteria will be used to determine if administration of the Western Joshua Tree Conservation Fund, development and execution of written interagency agreements or written MOUs with land management entities, and other actions are effective at achieving the vision, purpose, and objectives of the Conservation Plan.

## 5.4 PRIORITY MANAGEMENT ACTIONS FOR MANAGEMENT UNITS

Management units are outlined and delineated in Section 4.4, "Management Units," based on criteria for expected climate conditions, quality of habitat, existing management authorities, and land ownership. Organizing the landscape into management units based on these characteristics of the landscape will help guide the application of the Conservation Plan's management actions.

Although the management actions described in this chapter (which are summarized in Table 5-2 below) could apply to any management unit, certain management actions are recommended as priorities for specific management units (Table 5-3). For example, regardless of habitat conservation value, the management actions in Tribal Land units will prioritize establishing co-management principles and mutually defining elements of co-management. Some management actions could be applied throughout the species range without prioritization by management units. For example, conducting research and gathering information will help inform management in all management units in the future. Conducting education and outreach will similarly help educate the public and improve management in all management units.



**Table 5-2 Summary of Management Actions**

| Management Action Abbreviation | Management Action Title                                 |
|--------------------------------|---------------------------------------------------------|
| A&M 1                          | Avoid Direct and Indirect Impacts                       |
| A&M 2                          | Minimize Direct and Indirect Impacts                    |
| A&M 3                          | Minimize Impacts from Wildland Fire and Fire Management |
| LC&M 1                         | Identify Priority Conservation Lands                    |
| LC&M 2                         | Protect Priority Conservation Lands                     |
| LC&M 3                         | Manage Conservation Lands                               |
| LC&M 4                         | Restore and Enhance Habitat                             |
| LC&M 5                         | Establish Seed Banks and Nurseries                      |
| TCM 1                          | Establish Co-Management Principles                      |
| TCM 2                          | Mutually Define Elements of Co-Management               |
| R&I 1                          | Continue Research and Information Development           |
| E&A 1                          | Support Education and Outreach                          |

Source: Compiled by Ascent in 2024.

**Table 5-3 Priority Management Actions for Western Joshua Tree Management Units by Conservation Value Category and Predicted Climate Refugia**

| Management Unit Type <sup>1</sup>             | Ecologically Core and Intact                                              | Predicted Climate Refugia Category <sup>2</sup> in Ecologically Core and Intact        | Moderately Degraded and Highly Converted       | Predicted Climate Refugia Category in Moderately Degraded and Highly Converted         |
|-----------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------|
| Wilderness                                    | A&M 3 <sup>3</sup><br>LC&M 3 <sup>3</sup><br>LC&M 4 <sup>3</sup>          | A&M 3 <sup>3</sup>                                                                     | LC&M 3 <sup>3</sup><br>LC&M 5 <sup>3</sup>     | LC&M 1 <sup>4</sup><br>LC&M 3 <sup>3</sup><br>LC&M 5 <sup>3</sup>                      |
| Preservation with Light Recreation/ Other Use | A&M 1<br>A&M 2<br>A&M 3<br>LC&M 3<br>LC&M 4<br>LC&M 5                     | A&M 1<br>A&M 2<br>A&M 3                                                                | LC&M 3<br>LC&M 4<br>LC&M 5                     | LC&M 1 <sup>4</sup><br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3           |
| Defense                                       | LC&M 1<br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 | LC&M 1 <sup>4</sup><br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 | LC&M 1<br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5 | LC&M 1 <sup>4</sup><br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 |



| Management Unit Type <sup>1</sup> | Ecologically Core and Intact                                              | Predicted Climate Refugia Category <sup>2</sup> in Ecologically Core and Intact        | Moderately Degraded and Highly Converted                | Predicted Climate Refugia Category in Moderately Degraded and Highly Converted                 |
|-----------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Tribal Land                       | TCM 1<br>TCM 2<br>A&M 1<br>A&M 2<br>A&M 3<br>LC&M 3<br>LC&M 4<br>LC&M 5   | TCM 1<br>TCM 2<br>A&M 1<br>A&M 2<br>A&M 3                                              | TCM 1<br>TCM 2<br>LC&M 3<br>LC&M 4<br>LC&M 5            | TCM 1<br>TCM 2<br>LC&M 1 <sup>4</sup><br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 |
| Mixed Use                         | LC&M 1<br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 | LC&M 1 <sup>4</sup><br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 | LC&M 1<br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5          | LC&M 1 <sup>4</sup><br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3         |
| Little or No Protection           | LC&M 1<br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 | LC&M 1 <sup>4</sup><br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3 | LC&M 1<br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>E&A 1 | LC&M 1 <sup>4</sup><br>LC&M 2<br>LC&M 3<br>LC&M 4<br>LC&M 5<br>A&M 1<br>A&M 2<br>A&M 3         |

<sup>1</sup> Although actions described in this chapter can be applied to any management unit, the actions listed in this table identify the highest priority management actions for each unit.

<sup>2</sup> Recommendations for the predicted climate refugia category can be applied to any unoccupied future suitable habitat category that is identified.

<sup>3</sup> Management activities on conservation lands may be allowed in wilderness areas or may be limited by the administering agency to protect wilderness values.

<sup>4</sup> If priority conservation lands are identified in the predicted climate refugia category that is present within moderately degraded or highly converted land, management should prioritize avoiding and minimizing impacts.

Source: Compiled by Ascent in 2024.

In ecologically core and intact habitat that currently have land protections (i.e., Wilderness, Preservation with Light Recreation/Other Use), avoiding and minimizing impacts should be prioritized. Because management actions in wilderness areas are limited to protecting wilderness values, coordination with BLM, USFS, and NPS will be imperative. In addition, these areas should prioritize identifying, protecting, restoring, and managing priority conservation lands (Actions LC&M 3, LC&M 4, and LC&M 5), including collecting seed when appropriate. In Tribal Land units, management should follow recommendations for Wilderness and Preservation with Light Recreation/Other Use units, as well as implementing tribal focused management actions. In ecologically core and intact habitat that do not currently have protection or have minimal land protections (i.e., Little to No Protection, Mixed Use, and



Defense), management should focus on identifying, protecting, and managing priority conservation lands and avoiding and minimizing impacts.

Although some lands are classified as ecologically core and intact habitat in the ecoregional assessment, there may be opportunities in these areas to benefit from restoration based on finer-scale and site-specific assessments for specific projects or site-scale planning decisions (Randall et al. 2010). This would be determined on a site-by-site basis.



Source: Jeb Bjerke, California Department of Fish and Wildlife.

Within the moderately degraded or highly converted habitat that have minimal to no land protections (i.e., Little to No Protection, Mixed Use, Defense units), management should focus on identifying, protecting, managing, and restoring priority conservation lands and avoiding and minimizing impacts. For the Little to No Protection units categorized as moderately degraded or highly converted habitat, education and awareness should also be prioritized. In areas of moderately

degraded or highly converted habitat that have land protections (i.e., Wilderness, Preservation with Light Recreation/Other Use), management should focus on identifying, protecting, managing, and restoring priority conservation lands and avoiding and minimizing impacts. To protect wilderness values, some actions may not be allowed or may be limited in Wilderness units by the administering agency. In Tribal Land units, management should follow recommendations for Wilderness and Preservation with Light Recreation/Other Use units, as well as implementing tribal focused management actions.

Management of land in the predicted climate refugia category within ecologically core or intact habitat that have minimal or no protections (i.e., Little to No Protection, Mixed Use, and Defense units) should prioritize identifying, protecting, managing, and restoring priority conservation lands. Management units containing land in the predicted climate refugia category in ecologically core or intact habitat with land protections (i.e., Wilderness, Preservation with Light Recreation/Other Use) should prioritize avoidance or minimizing impacts to the greatest extent feasible. In Tribal Land units, management should follow recommendations for Wilderness and Preservation with Light Recreation/Other Use units, as well as implementing tribal focused management actions.

There may be areas that are degraded but have land in the predicted climate refugia category, so it should be determined whether restoring these areas would further the conservation of the species. Management should prioritize avoiding and minimizing impacts



on any priority conservation lands within degraded areas, or priority conservation lands that contain minimal or no protections that are also within the predicted climate refugia category. The recommendations for areas in the predicted climate refugia category also apply to land within the unoccupied future suitable habitat category where western Joshua trees could naturally disperse (Shryock et al. forthcoming).

In addition, opportunities for assisted migration in areas that are currently unoccupied by western Joshua tree but are potentially suitable for the species and modeled as future climate refugia should receive further evaluation if scientific evidence supports its feasibility and effectiveness. Assisted migration may have conservation value if questions about its effectiveness for species conservation are resolved, costs become feasible, and the owners and managers of receiving land are supportive.





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# Appendix E.

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## Relocation Guidelines and Protocols



# Western Joshua Tree Relocation Guidelines and Protocols

California Department of Fish and Wildlife  
July 2024

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## Introduction

The California Department of Fish and Wildlife (CDFW) developed this document to provide guidance on how and when to relocate western Joshua trees (*Yucca brevifolia*) in order to minimize impacts to populations, prevent habitat fragmentation, and preserve connectivity corridors for gene flow and pollinator migration.

The Guidelines section of this document discusses the circumstances in which CDFW would consider including permit conditions requiring relocation of one or more western Joshua trees under the Western Joshua Tree Conservation Act (WJTCA). The Protocol section of this document provides a summary of best practices for relocating western Joshua trees and increasing the survival rate of relocated (salvage) western Joshua trees. Information on post-relocation maintenance, monitoring, and reporting is also provided. This document will be updated as needed based on the best scientific information available.

## Western Joshua Tree Conservation Act Relocation Provisions

Section 1927.3, subdivision (a)(4)(A) of the California Fish and Game Code gives CDFW authority to require WJTCA incidental take permittees to relocate one or more western Joshua trees. Furthermore, pursuant to that subdivision, where relocation is required, permittees must implement reasonable measures required by CDFW to facilitate the successful relocation and survival of salvage trees. Relocation is deemed successful where the health of a salvaged western Joshua tree is stable or improving without any supplemental care after the post-relocation maintenance period. The relocation measures shall include but are not limited to:

1. A requirement that the salvage trees are placed in locations and with proper orientation to improve their chances of survival.
2. A requirement that salvage trees are relocated at a time that maximizes their chances of survival when feasible.
3. A requirement that a desert native plant specialist be onsite to oversee relocation.

Fish and Game Code section 1927.3, subdivision (a)(4)(B) states that CDFW may limit relocation requirements to certain size classes of trees.

This document is intended to fulfill the requirement of Fish and Game Code section 1927.3, subdivision (a)(4)(C) that by July 1, 2024, CDFW adopt guidelines and relocation protocols, developed in consultation with desert native plant specialists, based on the best available science, to relocate western Joshua trees successfully. Pursuant to Fish and Game Code section 1927.3, subdivision (g)(1), the permittee shall be legally responsible for ensuring the measures included in its WJTA ITP are implemented consistent with these guidelines. The permittee may, however, contract with the landowner of the relocation site(s) to conduct the post-relocation maintenance and monitoring activities required under its WJTCA ITP.



Subdivision (g)(2) of that section further states, "[u]nless specifically required by written agreement, a landowner that agrees in writing to allow western Joshua trees to be relocated onto land it owns shall not be liable for the continued survival of the western Joshua trees, shall not be required to manage or maintain the translocated western Joshua trees, and shall not be required to change existing land use practices, provided that the land use practices do not result in the taking, possession, sale, or further translocation of the western Joshua trees." While landowners accepting salvage trees are not responsible for maintaining the trees or otherwise ensuring the trees' continued survival, it is important to note that import, export, take, possession, purchase, and sale of salvage trees or any part or product thereof, is prohibited, except as authorized pursuant to the WJTCA.

The WJTCA also requires CDFW, by December 31, 2024, to prepare a Western Joshua Tree Conservation Plan in collaboration with the Fish and Game Commission, other governmental agencies, California Native American tribes, and the public and to incorporate in the plan, among other provisions, protocols for the successful relocation of Western Joshua trees. The Commission will then consider the plan and take final action on the conservation plan by June 30, 2025. During the one-year period between implementation of the July 1, 2024, relocation standards and finalization of the Western Joshua Tree Conservation Plan by June 30, 2025, CDFW will have an opportunity to supplement the collection of best available science and recommend appropriate amendments as part of the Commission's process of considering and taking final action on the Conservation Plan. These guidelines will be incorporated by reference into the Western Joshua Tree Conservation Plan.

## Definitions

The following definitions are used in this document:

Bare root relocation – method for relocating a living western Joshua tree by excavating around the root ball of the tree to dislodge the tree from the ground. Any relocation method other than tree spade relocation (defined below) is considered bare root relocation for the purposes of this document.

Containerize – to place a salvage tree into a container, such as a plastic pot or tree box, for temporary storage.

Project site – the area(s) where project activities are expected to occur (e.g., access, staging, construction, etc.)

Recipient site – a salvage tree's (defined below) final planting location.

Relocation – the removal of a living western Joshua tree from the ground and transplantation back into the ground at another location (referred to as a recipient site).

Relocation area – an area with one or several recipient sites.

Retained tree – a living western Joshua tree that is located within the project site, may be avoided or minimally impacted by the project and will therefore not be relocated.

Root ball – a mass of soil that contains concentrated roots growing from the base of the stem of a western Joshua tree.

Salvage tree – a living western Joshua tree that is being, or has been, relocated. Each western Joshua tree stem or trunk arising from the ground shall be considered an individual tree, regardless of its proximity to any other western Joshua tree stem or trunk.

Size Class A – a western Joshua tree that is less than one meter in height.

Size Class B – a western Joshua tree that is one meter or greater, but less than five meters in height.

Size Class C – a western Joshua tree that is five meters or greater in height.

Tree spade – a specialized piece of heavy equipment that consists of hydraulically controlled spade blades that can encapsulate the root ball of a salvage tree, as well as adjacent soil.

Tree spade relocation – method for relocating a living western Joshua tree by using a tree spade to dig, transport, and replant a western Joshua tree and its root ball.

## Best Available Science on Relocation

There are many accounts of successful western Joshua tree relocation (i.e., stable or increasing signs of tree health without any supplemental care after a period of maintenance), but little scientific research has been done to compare the relative success rates for different relocation techniques. Rather, most relocation efforts that monitor salvage western Joshua tree survivorship evaluate only one method of relocation (i.e., using hand tools for small trees and/or excavators or tree spade for large trees) (Wagner 2018, Balogh 2019, City of Palmdale 2024). The best available scientific information on how to achieve success when relocating western Joshua trees therefore comes from the experience of experts working in the field of restoration and Joshua tree relocation. In Bainbridge (2007), the author offers advice on relocating Joshua trees and other salvaged succulents, such as cacti and shrubs, based on his expertise and knowledge. The National Park Service (NPS) (Goodwin 2024) and a tree transplanting expert (Reynolds 2024) also provided CDFW with information relevant to the development of this document.

In addition, CDFW reviewed the results of known relocation projects. Bainbridge (2007) states that "Joshua trees often transplant well but require intensive aftercare and irrigation[.]" Bainbridge suggests that relocation is best done with machinery, but hand tools can also be used. Front loaders, excavators, and hydraulic tree spades are useful.

Tree spades work best in silty or sandy soils but using them is difficult in rocky soils. Salvaged trees can be placed in containers or immediately replanted but should be protected as much as possible from drying winds, heat, and sun. Bainbridge (2007) also mentions that yucca, such as western Joshua trees, seem to survive better if replanted in the same orientation they grew. Overall, Bainbridge (2007) shows the survival rates for salvage trees can be improved if the relocation work is timed carefully, the trees are handled gently, and there is good aftercare and irrigation in a holding facility or at the recipient site. Goodwin (2024) and Reynolds (2024) suggest that minimizing disturbance to the root ball and adequate care after trees have been relocated are the most important factors for successful relocation. Tree spade relocation of western Joshua tree minimizes impacts to roots and can have a success rate of greater than 90% with sufficient aftercare (City of Palmdale 2024, Goodwin 2024, Reynolds 2024). Bare root relocation of western Joshua tree causes more damage to roots and is reported to have a success rate of approximately 50-90% even with sufficient aftercare, based on preliminary findings of a monitoring period of 1-3 years (Goodwin 2024, Reynolds 2024). Beyond the initial 3-year monitoring period, however, success rates can decline (Graver 2024). This document describes additional methods that can be used to aid long-term survival and improve chances of reproduction events. However, there is no foolproof method that guarantees relocation success, and some mortality is always expected to result. Therefore, relocation is considered a method to minimize impacts to western Joshua tree populations, rather than a substitution for mitigation through the payment of fees.

The size and growth pattern of a western Joshua tree may also present additional challenges. Small trees, especially those salvaged through the bare root method, experience higher rates of mortality even with sufficient aftercare (Goodwin 2024). And, though it may be possible to relocate western Joshua trees over 7 meters in height, tree spades may be unable to sufficiently encapsulate the root ball for trees of this size (Reynolds 2024). These trees may also be difficult to stabilize to withstand high wind speeds after being relocated. Dense, clonal reproduction can also affect relocation success. Separating smaller trees from larger, parent trees that are connected through rhizomes below ground can result in higher mortality rates for those smaller trees (Goodwin 2024, Graver 2024).

## Guidelines

### Relocation Requirement Considerations

CDFW will determine whether relocation will be required under a WJTCA incidental take permit (ITP) during the permit application review process. Factors that CDFW may consider in making this determination for each project site include the following:

- Number of trees to be lethally taken (greater than 20 trees removed);
- Area of impacted western Joshua tree habitat within a project site (greater than 20 acres impacted);

- Avoidance and minimization measures proposed by the applicant to reduce project impacts to western Joshua tree;
- Quality of habitat on, and adjacent to, the project site (e.g., ecologically core or intact);
- Overall population health on the project site (e.g., declining versus stable or increasing);
- Whether the project is within predicted climate refugia for western Joshua tree.
- Extent of permanent project impacts;
- Density of clonal growth; and
- Anticipated temporal impacts of a project including operation or maintenance activities, where applicable.

When CDFW staff determine that a WJTCA ITP will require relocation of western Joshua trees, the applicant will develop a [Relocation Plan](#) for CDFW approval, including the number of trees to be relocated and the method(s) for relocation. Applicants will calculate the number of trees to be relocated based on the number of trees that will be lethally taken as confirmed by the approved census. The number of trees to be relocated will be based on the expected rate of relocation success for each method used, as well as the size class of each tree proposed for relocation, as explained below:

|                           | Bare root relocation <sup>1</sup> | Tree spade relocation <sup>2</sup> |
|---------------------------|-----------------------------------|------------------------------------|
| Size Class A (<1 m)       | 30%                               | 15%                                |
| Size Class B (≥1m and <5) | 20%                               | 10%                                |
| Size Class C (≥5m)        | 10%                               | 5%                                 |

Table 1. Recommended western Joshua tree Relocation Percentages

The number of trees in each size class recommended for relocation under a WJTCA ITP should be rounded to the nearest whole number and be greater than zero, provided at least one tree in that size class will be lethally taken. Because tree spade relocation has a higher expected success rate than bare root relocation, the relocation of fewer trees is required to minimize project impacts and offset the expected mortality of salvage trees where the tree spade method is used. See "[WJT Salvage Requirement Calculator spreadsheet](#)" for assistance in calculating salvage tree numbers using a combination of methods.

<sup>1</sup> When conducted in accordance with this document, the expected success rate of bare root relocation is between 50 and 90 percent (Goodwin, J. 2024. Joshua Tree National Park. Discussion with J. Goodwin, Vegetation Branch Manager. *in.*; Reynolds, D. 2024. The Landscape Center. Discussion with D. Reynolds, Project Manger/ISA Certified Arborist. *in.*).

<sup>2</sup> When conducted in accordance with this document, the expected success rate of tree spade relocation is greater than 90 percent (Goodwin, J. 2024. Joshua Tree National Park. Discussion with J. Goodwin, Vegetation Branch Manager. *in.*; Reynolds, D. 2024. The Landscape Center. Discussion with D. Reynolds, Project Manger/ISA Certified Arborist. *in.*; City of Palmdale. 2024. Report of the City of Palmdale Joshua tree preservation program.).

Example:

Project A is expected to cause lethal take of 200 western Joshua trees: 100 Class A trees, 70 Class B trees, and 30 Class C trees.

- If the bare root relocation method is used, the Relocation Plan should propose relocating 47 trees: 30 Class A trees, 14 Class B trees, and 3 Class C trees.
- If the tree spade relocation method is used, the Relocation Plan should propose relocating 24 trees: 15 Class A trees, 7 Class B trees, and 2 Class C trees.
- If a combination of methods is used, one example of mixed methods may include:
  - Tree Spade: 10 Class A, 5 Class B, 1 Class C and,
  - Bare Root: 10 Class A, 4 Class B, 1 Class C

An approved Relocation Plan is an attachment to the WJTCA ITP and any changes after issuance of the associated WJTCA ITP will require amendment of the permit. If the permittee later wishes to relocate or remove any western Joshua tree that has been relocated on-site, the permittee must apply for a new WJTCA ITP.

### Adjustments to Requirements

Upon review of a Relocation Plan, CDFW may, in its discretion, adjust the number of trees in a size class that must be relocated, including at the request of an applicant. Factors that may weigh in favor of an adjustment to the number of trees within a specific size class that must be relocated include:

- A higher number of trees in a different size class will be relocated;
- Trees that will be retained in place that will be minimally impacted;
- The size and physical characteristics of the available recipient sites, including available capacity for additional trees;
- The composition of the soil/substrate and feasibility of the proposed relocation method;
- The overall health of the western Joshua trees to be impacted; and
- The overall health of the western Joshua tree population around the project site.

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Where avoidance and relocation are not feasible (for example, when there are an extensive number of trees), revegetation and/or restoration of habitat can be utilized to minimize impacts. Revegetation and/or restoration undertaken pursuant to an existing statutory scheme requiring success criteria, monitoring, and financial assurances to ensure completion of the revegetation and/or restoration can satisfy this management action.

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### Relocation Areas

The applicant should identify one or more relocation areas in the proposed Relocation Plan they submit to CDFW for approval. The permittee should first evaluate if salvage



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trees can be relocated on the project site and if any project design modifications can be made to accommodate salvage trees on site.

If salvage trees cannot be relocated on the project site, the permittee must propose one or more off-site relocation areas that can accept trees designated for relocation. Off-site relocation areas must be within occupied western Joshua tree habitat that has been degraded by impacts (e.g., human, wildfire). If available, priority should be given to relocation areas located within local preserves, parks, land trusts, and conservancies. Salvage trees should not be relocated where relocation activities could disrupt existing

ecosystem processes, the genetic integrity of healthy western Joshua tree populations or the natural communities upon which they depend. Each salvage tree should be relocated as close to its original location as is possible. Criteria for selecting off-site relocation areas include:

- In a natural vegetation community that supports western Joshua trees;
- Within 16 kilometers of the salvage tree's original location;
- Within 152 meters of the salvage tree's original elevation; and
- Occupied habitat that has been previously impacted by wildfire or human activities that have led to the removal or death of western Joshua trees.

Relocation areas that do not meet the criteria listed above may be approved by CDFW on a case-by-case basis.

Once an off-site relocation area has been identified, the permittee must provide CDFW with written permission from the landowner of the proposed relocation area(s) confirming that the permittee will have site access to implement the maintenance and monitoring measures required under the WJTCA ITP. The landowner must also confirm in writing that CDFW staff may access the property to conduct compliance inspections in accordance with the measures outlined in the WJTCA ITP.

This document does not provide guidance regarding how to implement or support the assisted migration of western Joshua tree. At this time there is insufficient research published on the geographic boundaries of genetically distinct populations and/or climate adaptive traits within populations that may be suited for assisted migration to expand western Joshua's tree's range or assisted geneflow to enhance a population's ability to adapt to climate change impacts. Assisted migration, assisted geneflow, and/or boundaries of genetically distinct populations may be discussed in future amendments to this document.

### Relocation Plan

Where relocation is required, a Relocation Plan must be approved by CDFW prior to the issuance of an WJTCA ITP. The Relocation Plan may combine bare root and tree spade relocation methods and must include the following information:

- The contact information and qualifications of the desert native plant specialist(s) overseeing relocation;
- The date range when trees will be relocated. If salvage trees will be temporarily stored in containers, the plan must indicate when the trees will be replanted;
- The landowner's name, location name, and address or APN for each relocation area property;
- If salvage trees will be relocated outside of the project site, a signed, written statement from the owner of each relocation area granting permittee permission to relocate salvage trees to the relocation area property and access to implement any maintenance and monitoring measures;

- The unique identifier, size class, planned and contingency relocation methods, current and recipient site GPS coordinates (latitude/longitude in decimal degrees), overall health of each tree, signs of pest/human damage (if any), and a photo of each tree to be relocated, (see the [census instructions](#) for submitting photographs);
- If utilizing multiple receiver sites, the permittee must document the receiver site where each tree will be relocated using the unique identifier and recipient site coordinates;
- If tree spade relocation is proposed, additional trees must be identified for relocation as a contingency in case the tree spade relocation method is impractical due to rocky terrain or other issues. The number of additional trees that must be identified will vary on a project-by-project basis. The information described above must be provided for each additional contingency tree; and
- Any other pertinent information regarding relocation operations.

Each permittee may, but is not required to, use [CDFW's Relocation Plan template](#) and [spreadsheet](#), so long as the permittee's proposed Relocation Plan contains all the required information set forth above. Any questions regarding the development of the Relocation Plan should be discussed with CDFW staff prior to submittal in order to avoid project delays.

## Protocol

### Pre-Relocation

#### Selecting Trees for Relocation

Western Joshua trees that are in good health should be prioritized for relocation. Indications that a tree is in good health include where 60% or more of the tree's branches are living; minimal pest damage (no or few bore holes and/or less than 25% periderm [bark] stripping); recent signs of unrestricted hard growth; recent signs of flowering events, and/or strong vigor. Where a tree is greater than 7 meters in height, its size may limit its ability to be successfully relocated. Therefore, healthy salvage trees between 5-7 meters in height should be prioritized within Size Class C.

#### Siting

Trees identified for relocation should be clearly flagged or marked with a unique identifier and the recipient site should be identified before tree removal begins. Preferred and contingency methods for each relocation should also be identified (e.g., bare root relocation versus tree spade relocation) in advance. Each recipient site should be compatible with the corresponding salvage tree's relocation method (see Tree Spade Relocation under Digging/Tree Removal section below). The recipient site location should also be recorded using a Global Positioning System (GPS) unit and marked with pin flags or wood stakes that are clearly labeled with the unique identifier of the corresponding salvage tree. The permittee should identify a recipient site for each salvage tree that is: accessible for relocation and irrigation equipment, such as

water trucks or trailers; provides or enhances connectivity corridors; and mimics the density of the surrounding WJT population and is located at least 4.5 meters from the nearest western Joshua tree. If possible, recipient site locations should be chosen at random and be spatially balanced throughout the relocation area. Geographic Information System (GIS) tools can assist with this process.

Timing

When feasible, western Joshua trees should be relocated at a time that maximizes their chance of survival. (Fish & G. Code, § 1927.3, subd. (a)(4)(A)(ii).) The optimal time to relocate trees occurs in the fall when heat/drought stress is low and roots have adequate time to reestablish before the onset of hot, dry summer conditions. For bare root relocation, winter is a suboptimal but acceptable time to relocate trees but provides less time for roots to re-establish and may result in lower rates of survival. For tree spade relocation, there is a wider range of suboptimal but acceptable times to relocate trees because this method results in less root exposure and potential water loss through evapotranspiration as compared to bare root relocation. Relocating when trees are exposed to hot conditions for an extended period, should be avoided.

Bare Root Relocations

| Winter | Spring | Summer | Fall      |
|--------|--------|--------|-----------|
| OK     | Avoid  | Avoid  | Preferred |

Tree Spade Relocations

| Jan | Feb | Mar | Apr | May   | Jun   | Jul   | Aug | Sep | Oct    | Nov    | Dec    |
|-----|-----|-----|-----|-------|-------|-------|-----|-----|--------|--------|--------|
| OK  | OK  | OK  | OK  | Avoid | Avoid | Avoid | OK  | OK  | Prefer | Prefer | Prefer |

Pre-Relocation Watering

In preparing for relocation, both the salvage trees and the recipient sites should be watered 24-48 hours in advance. An earthen berm 4-6 inches in height should be created around the trees and recipient sites to create water basins that ensure water saturates the soil around the root ball and recipient site. For bare root relocations, the perimeter of the berm should be no less than 24 inches from the base of the trunk. For tree spade relocations, the size of the berm should be slightly wider than the width of the tree spade to be used on that individual. The water basins should be filled with water to just below the top of the berm twice and allowed to fully drain between fillings. Root stimulant additives such as vitamin B1 and rooting hormone may assist in root regeneration but are not required. Root stimulant additives should be utilized according to product label recommendations.

Orientation

Prior to relocation, using a compass set to the correct declination, mark the north side of the tree identified for relocation with a water-based tree marking paint or other CDFW-approved means in a place that will not be impacted or obscured during

relocation operations (e.g., a small paint mark on the trunk 12 inches above ground level or ribbon tape tied to one of the branches on the north side of the tree). When setting a salvage tree in a recipient site, best efforts should be made to place the tree in its original orientation; however, this may not be possible based on the terrain of the recipient site.

#### Other Pre-Relocation Precautions

- Relocation operations should adhere to the American National Standards Institute Z133 Safety Requirements for Arboricultural Operations.
- Permittees should obtain all information necessary to avoid existing underground infrastructure at salvage and recipient sites prior to relocation (see [Underground Service Alert of Southern California \(DigAlert\)](#)).
- To prevent the spread of invasive species and pathogens, digging equipment should be clean and free from dirt and debris and sanitized with a 10% bleach solution prior to arriving at the site where trees will be salvaged.
- Depending on the method used, tree limbs may need to be trimmed to facilitate relocation. Limbs should only be trimmed as necessary to facilitate relocation.

#### Relocation

##### Digging/Tree Removal

If trees are in close proximity to each other (less than 18 inches apart at the bases of their trunks), all efforts should be attempted to relocate the trees together to avoid separation of trees that are connected through rhizomes below ground.

Bare root removal by hand – Relocations using only hand tools should only be done for trees that are less than 1 meter in height. The root ball and surrounding soil should be salvaged in a way that keeps the root ball as intact as possible. This can be accomplished by excavating a circular trench 10-12 inches deep, 1-2 feet from the base of the trunk. Once the trench is complete, hand tools should be used to undercut the root ball and sever the roots below. Only apply as much lateral pressure to the tree as necessary to expose roots for severing with hand tools. The cut surfaces on roots should be kept small to minimize root dieback and exposure to soil-borne pathogens.

Bare root removal by (non-tree spade) heavy equipment/excavator – As with bare root removal by hand, the root ball and surrounding soil should be salvaged in a way that keeps the root ball as intact as possible. There are different ways to accomplish this using an excavator, depending on the tree's size, soil conditions, and other factors. For trees that are less than 1 meter in height, an excavator with a bucket attachment at least 24 inches in width can be used to extract the tree and root ball in one scooping motion. The equipment operator should minimize incidental damage to the aboveground portion of the tree to the greatest extent possible. Root balls should be handled with care when they are unloaded from the bucket. For trees that are 1 meter or greater in height, a trench 18-24 inches deep should be excavated 2 feet from the base of the trunk. If the soil around the root ball stays intact and does not show signs of



fracturing, the tree should be firmly rigged to the rounded exterior of the bucket using nylon straps at least 4 inches in width (Figure 1). Additional cloth padding may be placed around the straps to prevent damage to the periderm. Straps should be rigged at multiple points along the main trunk of the tree to prevent excessive swinging once freed from the soil. Once firmly rigged, the root ball should be undercut using hand tools as safely as possible until all or most of the roots are severed. Snapping roots should be minimized, as much as possible.

If the soil around the root ball does not hold together and shows signs of fracturing and instability when excavating the trench, as is common in sandy soils, the excavator should be used to undercut the root ball as much as possible without causing the tree to fall freely to the ground.

The tree should then be rigged to the bucket attachment using the methods described above and gentle but increasing lateral pressure should be applied to the tree to dislodge the root ball and lay the tree down. Once the tree is resting on the ground, the straps may need to be adjusted in order for the tree to be picked up by the excavator.

Trees removed from the ground using the bare root method should be replanted or containerized within 24 hours of removal.



Figure 1 – Bare Root Removal: Removing soil around the root ball of a salvage tree using hand tools (left). Salvage tree being removed from the ground by an excavator (right).  
(Photo credit: National Park Service)

Tree spade relocation – Tree spades come in different sizes based on the width of the soil surface that they can encapsulate (Figure 2). Tree spades can be used to relocate

trees of most sizes. However, they are not recommended for trees over 7 meters in height due to stabilization issues during high-speed wind events after relocation.

The following steps must be carried out sequentially, in a timely manner, and thoughtfully. Each western Joshua tree and corresponding recipient site should be evaluated for tree spade acceptability prior to digging. The desert native plant specialist should evaluate soil conditions to assess whether large rocks or boulders may prevent tree spade blades from fully encapsulating the root ball. This may be apparent by scanning the surface of the surrounding area or reviewing existing soil maps (see "Shallow Excavation Ratings" on [NRCS Web Soil Survey: https://websoilsurvey.nrcs.usda.gov/app](https://websoilsurvey.nrcs.usda.gov/app)). Tree limbs may be trimmed only where necessary to allow the tree spade blades to fully close around the tree. The tree spade size should be selected to ensure the blades do not come within 18 inches of the base of the trunk at ground level. Recipient sites should be dug immediately before, or no more than 4 hours prior to, tree extraction to prevent the soil from drying out and collapsing. Excavated recipient site dirt should be used to backfill the tree removal site where available. Open pits should be flagged with stakes and high-visibility ribbon tape and temporary fencing should be installed around any unattended open pits to prevent people or animals from falling in.



Figure 2. A salvage tree being removed from the ground using a tree spade (Photo credit: National Park Service).

### Transporting Trees

If salvage trees are not going to be transported to recipient sites by hand or by the equipment used to extract the tree (e.g., by truck or trailer), precautions must be taken to avoid damage to the tree and root ball. Root balls should be loosely wrapped in burlap and kept moist during transport. Salvage trees should be supported at all times and not dropped or thrown. Salvage trees should be securely transported upright or at a slight angle. Salvage trees may touch other salvage trees during transport, but they should not be stacked or otherwise fully supported by other salvage trees. Salvage trees should be positioned in transport vehicles in a way that minimizes branch entanglement.

### Planting Methods

Bare root relocations - The width of each recipient site hole should be approximately 12 inches greater than the width of the root ball. Root balls should fit snugly within their recipient holes to avoid stabilization issues. The depth of recipient sites holes should be 2-4 inches less than the height of the root ball to account for settling. If recipient site holes are dug too deep, they should be backfilled and compacted by foot or using hand tools. Salvage trees should be placed as close to their original orientation as the terrain will allow. Salvage trees should be supported when lowered into holes. Holes should be simultaneously backfilled with soil and water to eliminate air pockets and voids. Soil should be lightly compacted by foot or using hand tools.

Tree spade relocations - The salvage trees should be placed as close to their original orientation as the terrain will allow. If needed, soil should be backfilled and lightly compacted by foot or using hand tools to meet the grade of the surrounding soil surface.

### Storage

If salvage trees need to be stored for later replanting, in-ground storage is preferred over containerizing. In-ground storage procedures should follow the pre-relocation water berm, planting, post-relocation water berm, and stabilization methods described herein. Salvage trees stored in-ground should be flagged for avoidance and/or fenced off.

If in-ground storage is not possible, each salvage tree should be placed in a container that is at least twice the size of the unrestricted root ball and includes drainage holes. The containers should be sanitized with a 10% bleach solution. The container should be filled using soil from the removal site if the salvage tree is being stored for less than 6 months or with a soil mix ratio of 100 parts organic potting soil to 160 parts course perlite to 200 parts washed concrete sand to 1 part "13-13-13" fertilizer (Goodwin 2024) if the salvage tree is being stored for longer than 6 months. The bottom one third of the container should be filled with soil mixture before placing the root ball into the container. Once the root ball is placed into the container, the remaining volume of the container should be filled with soil and water simultaneously to eliminate air pockets

and voids. Salvage trees should not be stored in containers for longer than 2 years unless approved by CDFW. Containerized salvage trees should be stored either upright or at a slight angle to improve drainage and prevent root rot. If weather forecasts predict wind gusts over 60 mph, containerized trees should be closely grouped and tied together 24 hours in advance for added stability. If containerized salvage trees are pushed over, they should be promptly righted and stabilized using the methods described below for the duration of the storage period. Containerized salvage trees should be maintained and monitored following the methods described below. If trees show signs of drought stress, watering frequency may need to be increased. Containerized soil should always be allowed to thoroughly dry out before rewatering. Containerizing a salvage tree that has been removed from the ground using the tree spade method in a container would eliminate the benefits from this relocation method; therefore, salvage trees removed from the ground using the tree spade method should always be stored in the ground.

## Post-Relocation

### Water Basins

An earthen berm at least 4 inches in height should be created around each salvage tree following relocation. The top of the berm should be level. For bare root relocations, the perimeter of the berm should be no less than 24 inches from the base of the trunk. For tree spade relocations, the perimeter of the berm should be the width of the tree spade.

### Stabilization

Stabilization material should be installed for salvage trees that are greater than 3 meters in height and for trees that are less than 3 meters in height with a tree height to canopy width ratio that exceeds 2:1. For example, a 2-meter-tall tree with a canopy width greater than 1 meter should have stabilization material installed. Non-abrasive guying materials, such as Arbor Ties, should be attached to three equidistant lateral ground-point anchors outside of the water basin. Guys should be taut but allow for some movement so they do not cause friction in light to moderate wind conditions.

### Identification

Each salvage tree should be clearly flagged with tape ribbon or a metal tree tag, and labeled with a unique identifier (e.g., #1, #2, #3) and the relocation date (or the date when first removed from the ground for containerized salvage trees) in the following format: MM/DD/YYYY. Each tree tag should be loosely secured to the main trunk of the tree, rather than nailed directly into hard growth, and should be visible from the south. Each western Joshua tree stem or trunk arising from the ground shall be considered an individual tree requiring flagging, regardless of its proximity to any other western Joshua tree stem or trunk.

### Recordation

A GPS unit should be used to record the location of each salvage tree's recipient site. The relocation method (bare root – hand, bare root – excavator, or tree spade) should also be recorded, along with a color photo of each tree taken from the south of the tree facing north. The picture should include the entire tree.

## Maintenance and Monitoring

Where relocation is required under a WJTCA ITP, it is the permittee's responsibility to ensure the maintenance and monitoring measures set forth below are implemented and as required in the permittee's WJTCA ITP.

### Site Visits

Site visits should be conducted by desert native plant specialists to determine maintenance needs for relocated trees according to the following schedule:

#### Year 1

- Months 0-3, once every two weeks.
- Months 4-12, once per month.

#### Year 2

- Months 13-24, every other month.

#### Year 3

- Months 25-36, every other month only for trees showing signs of declining health.  
At the end of the 3-year maintenance period, all trees should receive a final site visit and be assessed according to the Completion Report section below.

During site visits, desert native plant specialists should assess and record maintenance needs for each salvage tree. They should also have a site map showing the locations of all salvage trees, a GPS device to confirm salvage tree locations, and notes and photos from previous visits, and they should be prepared to address maintenance needs during site visit or shortly thereafter.

### Watering

During the months of May to September, salvage trees should only be watered during site visits if the total rainfall (or snowfall equivalent) for the region within which the recipient site is located is less than 0.4 inches within the previous 7 days. During the months of October to April, salvage trees should only be watered during site visits if the total rainfall (or snowfall equivalent) for the region within which the recipient site is located is less than 0.3 inches within the previous 7 days. Regional precipitation models may be used in determining rainfall amounts; however, rain gauges within, or adjacent to, relocation areas provide the best indicator of precipitation totals. Water basins should be filled to the top of the berm, but not allowed to overtop the berm.



### Tree Health

Tree health should be assessed by a desert native plant specialist and recorded for each salvage tree during site visits. Tree health should consider signs of new leaf growth, branch loss, signs of flowering/fruitletting, signs of pest/human-caused damage, leaf discoloration, restricted hard growth, overall vigor, and other indicators worth noting. If salvage trees are showing signs of increasing health after two years of maintenance, they do not need to be visited during the third year (see reporting requirements below), except for the final site visit.

### Invasive Plant Removal

Invasive plants should be controlled and removed within the water basin. Removal should occur before invasive plant seeds reach maturity. Invasive plants should be removed through mechanical methods and hand pulling or with hand tools, rather than by chemical means, and appropriately disposed of. In removing invasive plants, care should be taken to not damage salvage tree roots. A list of common invasive plant species can be found on the California Invasive Plant Council Invasive Plant Inventory (Cal IPC Inventory) website at: <https://www.cal-ipc.org/plants/inventory/>. Native plants should be retained where possible.

### Maintenance of Berms, Stabilization Supports, and Identification Markers

During site visits, berms should be checked for height and any breaks that would allow water to escape from the water basin. Stabilization supports should be checked for damage and tightness. If relocated trees are showing signs of leaning, stabilization supports should be added or adjusted. Identification markers should also be checked for intactness, legibility, and maintenance needs.

### Completion Activities

During the final site visit at the end of the 3-year maintenance period, berms, stabilization supports, and identification markers must be removed from the relocation area.

## Reporting

Where relocation is required under a WJTCA ITP, it is the permittee's responsibility to ensure the reporting measures set forth below are implemented. Where relocation is voluntary, CDFW requests that the permittee provide the same reporting information to CDFW to better inform updates to these guidelines and relocation protocols.

### Post-Relocation Reporting

When a WJTCA ITP requires relocation of western Joshua trees, the permittee must submit a post-relocation report to CDFW no more than 30 days after relocations are completed. The post-relocation report should include the following:

- The date range when relocation operations occurred.
- For each salvage tree:

- The unique identifier and recipient site coordinates;
- The final recipient site, including GPS coordinates (latitude/longitude in decimal degrees);
- The relocation method used;
- The height and diameter of the post-relocation water basin constructed;
- Any stabilization supports installed;
- Any major damage, including any necessary limb trimming, that occurred during relocation;
- Any deviation from the tree's original orientation;
- Any root stimulant additives used in pre- or post-relocation irrigations; and
- A photo of the tree facing north, with the unique identifier in each file name.

### Maintenance Reports

When a WJTCA ITP requires relocation of western Joshua trees, the permittee must submit annual reports detailing the 1-year and 2-year maintenance periods, as appropriate, to CDFW. Maintenance reports should include the following information:

- The date(s) when site visit(s) occurred;
- The contact information and qualifications of the desert native plant specialist(s) performing tree assessments;
- Information for each salvage tree regarding the following:
  - The unique identifier and recipient site coordinates;
  - Whether the tree is alive or dead;
  - Dates of supplemental waterings;
  - Identity and estimated number of invasive plants observed/controlled and the methods used;
  - Any signs of pest/human damage;
  - Any signs of declining tree health;
  - Any maintenance conducted to repair, replace, add, or adjust berm, stabilization supports, and/or identification markers;
  - A photo of the tree facing north, with the unique identifier in each file name; and
  - At the end of the 2-year period, the reasons for discontinuing maintenance on trees showing stable or increasing health, such as new leaf growth, flowering/fruitletting, good leaf color, no signs of pest/human damage, and/or unrestricted hard growth.

### Completion Report

A completion report must be submitted to CDFW no more than 30 days after the end of the 3-year maintenance period. The completion report must contain the following:

- The date when the final site visit occurred;

- The date when berm/stabilization materials/identification markers were removed;
- The contact information and qualifications of the desert native plant specialist(s) performing the final assessment;
- Information for each salvage tree regarding the following:
  - Whether the tree is alive or dead;
  - Any damage that occurred during or after relocation;
  - Any signs of declining health;
  - Any signs of pest damage; and
  - A photo of the tree facing north, after berm, stabilization materials, and identification markers are removed, with the tree's unique identifier in each file name; and
- Any recommendations that may help to improve tree relocation methods.

## Literature

Bainbridge, D. 2007. A guide for desert and dryland restoration: New hope for arid lands. Island Press, Washington D.C. 20009, USA.

Balogh, M. A. 2019. Mojave Desert ecosystem recovery: Potency of biotic and abiotic restoration methods in low elevation plant communities. University of Nevada, Las Vegas, Thesis, Las Vegas, Nevada, USA.

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Wagner, M. L. 2018. Factors influencing revegetation efforts in the Mojave Desert: Field studies and meta-analysis of the Morongo Basin and Joshua Tree National Forest. California State Polytechnic University, Thesis, Pomona, California, USA.

## Personal Communications

Goodwin, J. 2024. Joshua Tree National Park. Discussion with J. Goodwin, Vegetation Branch Manager. [22 Mar 2024].

Graver, N. 2024. Joshua Tree National Park. Desert Native Plant Specialist Review of "Western Joshua Tree Relocation Protocol". [10 June 2024].

Reynolds, D. 2024. The Landscape Center. Discussion with D. Reynolds, Project Manager/ISA Certified Arborist. [1 May 2024].



VIA E-MAIL: [fgc@fgc.ca.gov](mailto:fgc@fgc.ca.gov)

May 29, 2025

California Fish and Game Commission  
P.O. Box 944209  
Sacramento, CA 94244-209

**Re: Large-scale Solar Association's Comments on June 12 Meeting Agenda – Western Joshua Tree Conservation Plan (Agenda Item 22)**

Dear President, Vice President, and Members of the Commission:

On behalf of the Large-scale Solar Association (LSA), the Solar Energy Industries Association (SEIA), and the American Clean Power Association (ACP), we submit these comments on the revised draft Western Joshua Tree Conservation Plan (Plan). As leaders in California's clean energy transition, our organizations are committed to environmental stewardship and the thoughtful integration of renewable energy with conservation goals. Our members' projects are developed with careful attention to minimizing ecological impacts, and we appreciate the effort to support the long-term viability of the Western Joshua Tree (WJT). However, we remain deeply concerned that the final Plan imposes measures for buffer zones, seed collection, and relocation, as explained in LSA's letter of January 30, 2025, that are technically infeasible and misaligned with the underlying abundance of the species. These requirements, if not implemented reasonably and flexibly, will undermine the intent and efficacy of the Western Joshua Tree Conservation Act (Act) itself.

For example, the Department of Fish and Wildlife (Department) has been imposing requirements for habitat management lands for tree relocation that are ultra vires of the Act. Requiring a permittee to encumber lands it already owns, acquire and encumber new lands, or purchase the right to use and encumber the lands of another to receive trees is plainly a mitigation requirement. However, the Act provides that mitigation would be accomplished through the payment of an in-lieu fee, if the permittee so elected. To say that this additional mitigation requirement undermines the Act is an understatement.

Wholly apart from these fundamental flaws of the draft Plan, its adoption would be premature given the lack of stakeholder engagement on the final Plan.

These comments supplement LSA's letter of January 30, 2025 by outlining the following concerns and recommendations regarding the final Western Joshua Tree Conservation Plan:

- **Clarification and refinement of relocation guidelines:** As described in LSA’s prior comments, the relocation protocols outlined in the Plan disregard the viability or likelihood of successfully re-establishing WJTs, and they fail to acknowledge the fact that viable relocation sites are scarce. There is a lack of evidence outlining these relocation guidelines, and they challenge utility-scale solar project viability by requiring developers to identify, purchase, and manage additional lands for relocated trees. As would be expected, the additional costs to large-scale solar development are ultimately borne by ratepayers.

LSA, SEIA, and ACP believe that, in the first instance, the Plan should tie relocation requirements to the Act’s existing conservation and development fee zones to direct resources to where they can have the greatest ecological impact. Once such lands have been identified, the Department should not require a permittee to pay for the acquisition of a fee interest and/or conservation easement or deed restriction to support relocated trees, as doing so would amount to double (or more) mitigation on top of the fees paid pursuant to the Act. However, we would not be opposed to the Department’s using monies from the mitigation fees paid by the permittee (i.e., from the Western Joshua Tree Conservation Fund) to fund habitat mitigation lands to which trees can be relocated.

- **Acknowledgement of evidence regarding species abundance:** The Department’s Status Review previously demonstrated that the WJT is “widespread and abundant,” across its range, however, the Plan’s proposed conservation strategy neither recognizes nor reflects this reality. As a result, buffer zone, seed relocation, and relocation requirements as specified by the draft Plan and as implemented by the Department to date in issuing permits under the Act have been grossly disproportionate to the “widespread and abundant” nature of the species.
- **Recommendation to Delay Final Plan Vote:** Stakeholders have not been afforded an opportunity to review and analyze the final amended Plan, as it has not yet been released to the public. Robust transparency and public engagement are longstanding hallmarks of California’s regulatory processes, and the absence of both here is troubling given the complexity, breadth, and precedent-setting nature of the Plan, which governs not only the protection of a candidate species, but also the development of climate-critical clean energy projects within the Plan area. California can ill-afford to miss the mark with this Plan. To this end, we urge the Commission to delay its vote until a later meeting to allow for review and revision of the updated final Plan. A brief delay would enable the kind of stakeholder engagement and Department and Commission consideration the Plan deserves, and it would ensure stakeholders can adequately evaluate and contribute to the Plan before it is finalized.



## **Clarification and Refinement of Relocation Guidelines**

The relocation protocols outlined in the Plan present fundamental and immense challenges to utility-scale solar developers. Their impracticality is difficult to overstate. They lack the necessary robust scientific basis. And they fail to reflect the policy architecture of the Act. While we support conservation measures that protect the species, they must be calibrated with the operational realities of large-scale solar development and the scientific uncertainty that still surrounds Western Joshua Tree relocation (to say nothing of the “widespread and abundant” nature of the species).

As LSA has previously emphasized, the Act both provides the Department discretion whether to require relocation and includes no mandatory numeric or percentage thresholds. The Department should exercise this discretion in a way that aligns with both the still-nascent and evolving science and the dual goals of the Act – species conservation and continued development of clean energy to combat climate change, the most significant long-term threat to the WJT.

### *Technical Feasibility and Scientific Uncertainty*

Evidence indicates that relocated mature Joshua Trees – particularly those over 10 feet tall or with multiple branches – have a low survival rate.<sup>1</sup> This is especially true in arid, disturbed environments where many of the utility-scale solar projects are expected. Yet the draft Plan imposes onerous and expensive relocation obligations without regard to the viability or likelihood of successful establishment. Moreover, the current Plan fails to acknowledge the fundamental scarcity of viable relocation sites. Most lands within the WJT’s range are federally controlled and thus unavailable for relocation. The remaining private lands are costly and difficult to acquire, as demonstrated by the Department’s own limited success in securing lands through the WJT Conservation Fund. Those costs will ultimately burden ratepayers. Moreover, and in any event, requiring projects to identify, purchase, and manage additional lands for relocated trees in the guise of minimization is mitigation not contemplated by the Act and its in-lieu fee mitigation regime. Simply put, it is inconsistent with the Act. However, as noted above, LSA, SEIA, and ACP do not object to the Department using mitigation fees paid pursuant to the Act to fund the acquisition of such lands or interests in land.

### *Need for Zone-Based Relocation Requirements*

A critical oversight in the current Plan is its failure to tie relocation requirements to the Plan’s existing conservation and development fee zones. The Act intentionally established two zones – higher-fee and lower-fee areas – to allow for targeted conservation without unduly impeding vital infrastructure projects. Relocation requirements should mirror this framework. Explicitly integrating relocation guidelines with zonal designations would help direct resources to where they can have the greatest ecological impact, rather than applying blanket rules that may be wasteful and counterproductive in practice.

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<sup>1</sup> *Western Joshua Tree Relocation Guidelines and Protocols*. April 2025. California Department of Fish and Wildlife. <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=224036&inline>.

### **Acknowledgement of Evidence regarding Species Abundance**

According to data presented by the Department, the Western Joshua Tree remains “widespread and abundant” across its range.<sup>2</sup> The conservation strategy proposed in the Plan should reflect this reality, especially since failure to limit the scope of the Plan could result in a de facto land use management plan for 2.5 to 3.4 million acres (Status Review at 18). As noted, onerous and costly relocation measures are disproportionate to the actual threat levels identified in the Department’s own analysis.

Given the resilience and ubiquity of the species, we question whether such a prescriptive, inflexible relocation regime is scientifically justified. Strict, inflexible guidelines applied uniformly across the landscape risk stifling much-needed renewable energy development while offering limited additional ecological benefit to a species that is not imperiled at this time. The relative abundance of the species should inform all aspects of the Plan, including buffer and seed collection requirements.

### **Recommendation to Delay Final Plan Vote**

We are troubled that the Commission is scheduled to vote on the final Plan without having made the final document available to stakeholders for review. In fact, the attachments posted online under the Commission meeting documents merely state: “June 2025 Update Coming Soon!” Stakeholders have consequently not had an opportunity to review and analyze the final measures that will guide permitting and relocation for years to come. This lack of transparency and engagement is particularly vexing given the complexity and breadth of the Plan, its precedent-setting nature, and its effect on climate-critical clean energy projects across millions of acres of land.

At approximately 3 pm on May 28, 2025 – the afternoon before comments on the Plan are due to the Commission – the Department sent by e-mail its proposed revisions to perhaps the most important and controversial component of the draft Plan: the Western Joshua Tree Relocation Guidelines and Protocols. (The revised document appears to be mistakenly dated “April 2025.”) While we are currently reviewing this revised document to understand how it will impact clean energy project development, our overarching comments in LSA’s January 30, 2025 letter and this letter remain the same. We continue to urge the Commission to postpone its vote to a future meeting to allow time to review this document, a key component of the Plan’s appendices as it relates to clean energy.

We respectfully urge the Commission to delay its vote until a later meeting, as suggested by President Zavaleta in the April Commission meeting, to allow for a full review of the updated final Plan. Stakeholders should be given adequate time (no less than 30 days) to

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<sup>2</sup> *Report to the Fish and Game Commission – Status Review of Western Joshua Tree (Yucca brevifolia)*. March 2022. California Department of Fish and Wildlife.  
[https://www.biologicaldiversity.org/programs/public\\_land/pdfs/Western\\_Joshua\\_Tree\\_Status\\_Review\\_2022-04-13.pdf](https://www.biologicaldiversity.org/programs/public_land/pdfs/Western_Joshua_Tree_Status_Review_2022-04-13.pdf).

conduct a meaningful review to provide substantive feedback at a future Commission meeting. Although the Act sets a June 30, 2025 target for approval, that target is aspirational and should not be treated as binding in a way that compromises good governance and sound decision-making. In this case, a brief delay would enable a much-needed robust stakeholder engagement and consequently a better-informed and tailored Plan. The stakes are simply too high for a rushed vote.

We urge the Commission to take a prudent, transparent approach that fosters collaboration and trust in the development of this precedent-setting conservation framework. Ensuring stakeholders can fully evaluate and contribute to the Plan before it is finalized is not merely reasonable – it is essential.

### **Conclusion**

California is at an historic inflection point when it comes to addressing the nexus between climate action and conservation. The Western Joshua Tree Conservation Plan itself is a product of this crossroad – an effort obligated to protect both the species and the clean energy pathways critical to securing their long-term survival. It both the direction of the Act and the Commission's responsibility to balance these interrelated priorities with clarity and foresight. A truly functional Plan will be one that acknowledges the abundance of the species and revises the clean energy mitigation and relocation guidance accordingly – a balance that will require additional time for stakeholders, the Department, and the Commission to achieve.

We appreciate your leadership in this effort and your willingness to pursue policies that are more reflective of the complex future we face. Thank you for your consideration of our recommendations.

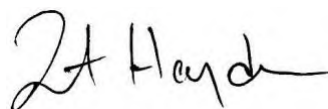
Sincerely,



Shannon Eddy  
Executive Director  
Large-scale Solar Association



Stephanie Doyle  
Director, State Affairs, California  
Solar Energy Industries Association



Quintana Hayden  
Senior Director, Wildlife & Federal Lands  
American Clean Power Association

**From:** Villenas, Fabian <[Fabian.Villenas@cao.sbcounty.gov](mailto:Fabian.Villenas@cao.sbcounty.gov)>  
**Sent:** Thursday, May 29, 2025 04:00 PM  
**To:** FGC <[FGC@fgc.ca.gov](mailto:FGC@fgc.ca.gov)>  
**Cc:** Fletes, Leia <[Leia.Fletes@cao.sbcounty.gov](mailto:Leia.Fletes@cao.sbcounty.gov)>  
**Subject:** Written Comments - June 11-12 Commission Meeting Item No. 22

Please find attached a comments letter from San Bernardino County for Item No 22, Review and Adoption of the Western Joshua Tree Conservation Plan, for the June 11-12<sup>th</sup> Fish and Game Commission meeting.

**Fabian Villenas**

Legislative Analyst

**County Administrative Office**

Phone: 909 387-4777

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**County Administrative Office**  
**Governmental & Legislative Affairs**

**Leia Fletes**  
Director

June 11, 2025

Erika Zavaleta, President  
California Fish and Game Commission  
715 P Street, 16th Floor  
Sacramento, CA 95814

**Re: Draft Western Joshua Tree Conservation Plan – Public Comments**

Dear President Zavaleta and Members of the Commission,

On behalf of San Bernardino County, I would like to thank the Fish and Game Commission for its thoughtful deliberation throughout the development of the Western Joshua Tree Conservation Plan (Plan). The County has actively engaged in this process from the outset, given our significant interest in how the Plan will affect both the construction and maintenance of essential infrastructure and the quality of life and safety for residents in Mojave Desert communities located within Western Joshua Tree (WJT) habitat. In addition to participating in public workshops hosted by the California Department of Fish and Wildlife (CDFW) since 2024, the County submitted formal comments at the Commission's hearings in January and April 2025.

While we recognize the considerable work that has gone into crafting the Plan, we remain concerned about its practical implications. We support efforts to preserve this iconic species for future generations but urge the Commission to ensure that conservation measures are balanced with ongoing needs for housing, economic opportunity, and infrastructure development, including strategies that enhance wildfire resilience and enable home hardening.

The County will continue to closely monitor the Plan's implementation and remains committed to working with the Commission and CDFW to address areas where adjustments may be warranted to ensure both ecological and community sustainability.

At the April hearing, we were encouraged to hear that several of the County's recommendations are being considered. Specifically, we support reducing buffer requirements for WJTs to a maximum of 20 feet, regardless of tree size. The current buffer guidance, which can extend up to 186 feet, is overly restrictive and inconsistent with the documented ability of mature WJTs to coexist with public infrastructure. A smaller buffer would still support conservation goals while significantly reducing the cost of permitting and mitigation. ***We appreciate CDFW's indication that revised buffer guidance is under***

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Chief Executive Officer



***development and may be included in the Plan's appendix or as a separate guidance document.***

We also appreciate the acknowledgment of our recommendation regarding wildfire safety. ***We support the proposed development of a programmatic framework to allow defensible space within five feet of structures, as confirmed by CDFW staff at the meeting.*** This exemption, which aligns with State Fire Marshal best practices, is critical to reducing wildfire risk and protecting both human life and Joshua tree populations in urban-wildland interface zones.

While we welcome progress on these two issues, ***we continue to advocate for an explicit exemption in the Plan for imminent and emergency infrastructure repairs necessary to protect life and property.*** Agencies such as the San Bernardino County Department of Public Works must be able to act swiftly to maintain or restore critical infrastructure, such as roads and flood control systems, particularly during or in preparation for emergencies. Delays caused by unclear permitting requirements in these situations jeopardize public safety and the continuity of essential services. We strongly urge the Commission to incorporate a clear exemption for imminent and emergency repairs in the final Plan.

San Bernardino County appreciates the opportunity to engage in this important effort and urges the Commission to adopt a balanced approach that protects the Western Joshua Tree while supporting the infrastructure and safety needs of our desert communities. We remain committed to working with the Commission and CDFW to ensure that implementation reflects both conservation priorities and operational realities on the ground. If you have any questions or require additional information, please contact Leia Fletes, Director of Government Relations, at (909) 387-4280 or [Leia.Fletes@cao.sbcounty.gov](mailto:Leia.Fletes@cao.sbcounty.gov).

Sincerely,



Dawn Rowe  
Third District Supervisor  
Chair, San Bernardino County Board of Supervisors

CC: Inland Empire Legislative Delegation

## Memorandum

**Date:** June 2, 2025

**To:** Melissa Miller-Henson  
Executive Director  
Fish and Game Commission

**From:** Charlton H. Bonham  
Director

**Subject:** **Submission of Initial Statement of Reasons for the June 11-12, 2025 Fish and Game Commission meeting to Add Section 749.14 to Title 14, California Code of Regulations, re: Special Order Relating to Take of Morro Manzanita (*Arctostaphylos morroensis*) During Candidacy Period**

On April 16, 2025, the Commission determined that listing Morro manzanita under the California Endangered Species Act (CESA) may be warranted pursuant to Fish and Game Code (FGC) Section 2074.2. Morro manzanita became a candidate species under CESA, effective upon publication of the notice of findings on May 16, 2025. Please find attached the Initial Statement of Reasons to add Section 749.14, Title 14, California Code of Regulations.

It was brought to the Commission's attention that a project that has completed environmental review in San Luis Obispo County was compromised with the candidacy of Morro manzanita. The County of San Luis Obispo proposes to replace the South Bay Boulevard Bridge (No. 49C-0351) ("Project") which spans Los Osos Creek so that it meets current seismic design standards and maintains safe, reliable service of a critical access corridor for the Los Osos and Morro Bay communities.

The enclosed regulation that adds Section 749.14 to Title 14, CCR aims to create a special order pursuant to FGC Section 2084 allowing take of Morro manzanita during the CESA candidacy process for the described Project. The proposed addition of Section 749.14 here represent the cumulation of the Department internal discussions with the County Public Works Department staff. Please see the enclosed documents and plan to submit for Notice of publication upon approval by the Commission at its June 2025 meeting.

If you have any questions or need additional information, please contact Isabel Baer at [\(916\) 203-3193](tel:203-3193). The Department point of contact for this regulation should identify Kristi Lazar, Native Plant Coordinator, who can be reached at [NativePlants@wildlife.ca.gov](mailto:NativePlants@wildlife.ca.gov).

ec: **Department of Fish and Wildlife**

Melissa Miller-Henson, Executive Director  
Fish and Game Commission  
June 2, 2025  
Page 2

Josh Grover, Deputy Director  
Ecosystem and Conservation Division

Julie Vance, Regional Manager  
Central Region

Krista Tomlinson, Env. Program Manager  
Central Region

Ryan Mathis, Acting Branch Chief  
Habitat Conservation Planning Branch

Isabel Baer, Env. Program Manager  
Native Plant Program  
Habitat Conservation Planning Branch

Ona Alminas, Env. Program Manager  
Regulations Unit  
Wildlife and Fisheries Division

Robert Pelzman, Assistant Chief  
Law Enforcement Division

Steven Ingram, Attorney  
Office of General Counsel

**California Fish and Game Commission**

Dixie Van Allen, Program Manager

Ari Cornman, Wildlife Adviser

Jenn Bacon, CESA Analyst

State of California  
Fish and Game Commission  
Initial Statement of Reasons for Regulatory Action

Add Section 749.14  
Title 14, California Code of Regulations  
Re: Take of Morro Manzanita During Candidacy

I. Date of Initial Statement of Reasons:

II. Dates and Locations of Scheduled Hearings

(a) Notice Hearing:

Date: June 11, 2025

Location: Sacramento, CA

(b) Discussion Hearing:

Date: August 13, 2025

Location: Sacramento, CA

(c) Adoption Hearing:

Date: October 8, 2025

Location: Sacramento, CA

III. Description of Regulatory Action

(a) Statement of Specific Purpose of Regulatory Change and Factual Basis for Determining that Regulation Change is Reasonably Necessary

Unless otherwise specified, all section references in this document are to Title 14 of the California Code of Regulations (CCR). All references to “CDFW” or “Department” mean the California Department of Fish and Wildlife. All references to “County” mean San Luis Obispo County, California.

State Statutory Background

On July 20, 2024, the Fish and Game Commission (Commission) received a petition from Dr. Christopher Kofron and Dr. Claudia Tyler to list Morro manzanita (*Arctostaphylos morroensis*) as an endangered species under the California Endangered Species Act (CESA). On July 30, 2024, the Commission transmitted the petition to the Department for review and recommendation pursuant to sections 2073 2073.5, Fish and Game Code.

FGC Section 2073.5 and Title 14, Section 670.1 requires that the Department evaluate the petition and submit a written evaluation with a recommendation to the Commission, which was received at the Commission’s December 2024 meeting. Based upon the information contained in the petition and other relevant information, the Department determined in its evaluation that there is sufficient scientific information available to indicate that the petitioned action may be warranted, and recommended that the Commission accept the petition for further consideration pursuant to CESA.

The petition evaluation was made available to the public for a 30-day public comment period prior to the Commission taking any action on the petition. Subsequently, on April 16, 2025, the Commission determined that listing may be warranted pursuant to Section

2074.2, Fish and Game Code. Morro manzanita became a candidate species under CESA, effective upon publication of the notice of findings on May 16, 2025 (Office of Administrative Law notice number Z2025-0505-03).

Pursuant to Section 2074.6, Fish and Game Code the Department will undertake a one year status review. With the status review, the Commission makes a final determination whether the petitioned action to list the species as threatened or endangered is warranted, based on the Department's status review and other information in the administrative record (Section 2075.5, Fish and Game Code). Candidate species are protected from take under CESA pursuant to Section 2085, Fish and Game Code during the remainder of the CESA listing.

During candidacy, authority under Section 2084, Fish and Game Code grants the Commission the ability to consider, exemption from the take prohibition for these species. Additionally, the Commission may adopt regulations to authorize take of candidate species, based on the best available scientific information, when the take is otherwise consistent with CESA.

## Federal Statutory Background

Morro manzanita has been listed under the Federal Endangered Species Act (ESA) as threatened since 1994. In 2008, 2013, and 2022, the United States Fish and Wildlife Service (USFWS) conducted 5-year reviews for Morro manzanita to ensure that its classification as a threatened species under the ESA provided the appropriate level of protection (USFWS 2008, 2013, 2022). All three USFWS 5-year reviews concluded that Morro manzanita still met the definition of a threatened species under the ESA (CDFW, 2024).

## Biology

Morro manzanita is an erect, evergreen shrub in the heath family (Ericaceae). Morro manzanita typically grows from 0.5 m to over 4 m (1.6 to 13.1 ft) tall, with flower petals that are urn-shaped, and white to pink in color. Stems have gray, shredding bark. Unlike other manzanita species, Morro manzanita lacks the presence of basal burl (woody growth), which allows for species to resprout after fire. In lacking basal burl, Morro manzanita relies on seed back in the soil to re-propagate habitat following wildfire (CDFW, 2024).

Morro manzanita is restricted to the northeast side of Morro Bay to the southern end of Montana de Oro State Park, a distance of less than ten miles, and occurs primarily on stabilized sand dunes associated with Baywood fine sand. Approximately 75 percent of its historical habitat has been converted for residential use, resulting in highly fragmented populations. There are several occurrences in and around the town of Los Osos in San Luis Obispo County.

## San Luis Obispo County Public Works Project

The County proposes to replace the South Bay Boulevard Bridge (No. 49C-0351) originally constructed in 1966 (hereafter, "South Bay Boulevard Bridge project" or "Project") which



spans Los Osos Creek. South Bay Boulevard is one of the two main access routes in and out of Los Osos and the only direct connector between Los Osos and Morro Bay. As such, South Bay Boulevard is a critical access corridor for local residents and emergency vehicles, as well as for evacuation for the Diablo Canyon Power Plant. The purpose of the Project is to replace the existing 70-year old bridge so that it meets current seismic design standards and maintains safe, reliable service of a critical access corridor for the Los Osos and Morro Bay communities. The new bridge and road approaches will be relocated to the east side of the existing bridge to preserve access during construction, and then the existing bridge demolished once the new bridge is open for use.

## Project Mitigation

An Initial Study/ Mitigated Negative Declaration was prepared by the Public Works Department of San Luis Obispo County (SCH 2021070094) and adopted by the County in August of 2021, which calls for a mitigation monitoring plan strategy, and specifies mitigation measures for biological resources (San Luis Obispo County, 2021).

The County has been updating a Habitat Mitigation and Monitoring Plan (HMMP) since its original draft (November 2020) to consolidate the project impacts for federal, state, and county jurisdictional requirements from the Project (San Luis Obispo County, 2024). Temporary construction impacts in uplands would include approximately 0.6 acre of upland historic fill area that has been colonized by Morro manzanita, and the area is proposed to be restored at a 1:1 mitigation ratio after temporary construction impacts are complete (San Luis Obispo County, 2024). For issuance of a Coastal Development Permit, the California Coastal Commission additionally requires a 2:1 mitigation ratio for temporary construction impacts. Permanent impacts to Morro manzanita habitat are estimated at 0.24 acre based on the project footprint, and mitigation is proposed at a 3:1 replacement ratio (for a total of 2.52 acres of Morro manzanita chaparral habitat needing replacement) (San Luis Obispo County, 2024). The proposed temporary and permanent impact areas contain approximately 23 and 30 individual shrubs, respectively, that may be removed by the project (for a total of 113 shrubs requiring mitigation). Morro manzanita plantings will be planted in a spread pattern with adequate spacing to best simulate the species' natural distribution (approximately 10 to 15 ft). (San Luis Obispo County, 2024)

The creation of the Morro manzanita mitigation site will be a benefit to recovery by increasing the total area occupied by Morro manzanita within its range by 0.48 acre. The restoration and mitigation areas will be managed under the HMMP finalized in collaboration with the Service. Further, the County will be developing and documenting improved techniques for removal, storage, and reinstallation of Morro manzanita individuals. More knowledge about Morro manzanita preservation and propagation will be a valuable tool to offset future impacts to Morro manzanita throughout its range and support its recovery

## Proposed Regulations

There are no existing regulations pertaining to the listing of Morro manzanita as threatened or endangered under CESA. The proposed addition of Section 749.14 to Title 14, CCR aims to create a special order allowing take of Morro manzanita during the CESA

candidacy process for the described Project. The proposed addition of Section 749.14 represents the cumulation of the Department internal discussions with the County Public Works Department staff.

The proposed regulations are as follows:

**Section 749.14. Special Order Relating to Take of Morro Manzanita (*Arctostaphylos morroensis*) During Candidacy Period.**

749.14 (a): This subsection names the proposed Project and provides the exemption from the Morro manzanita take prohibition during candidacy under CESA, as authorized by subsection 2084(b), Fish and Game Code. It is necessary so that the regulation can authorize take under CESA for the project. This subsection also lists the prerequisites for compliance for the exemption from the take prohibition to be granted:

749.14(a)(1): This paragraph names the USFWS Biological Opinion and Incidental Take Statement (2022-0025695-S7) that includes the terms, conditions, and measures required for compliance with ESA for the Project. It also mentions the HMMP to be finalized in coordination with USFWS as the design plans approach 100% to prepare for groundbreaking. This paragraph is necessary to provide the direct reference to the documents which prescribe the terms, conditions, and measures for compliance.

749.14(a)(2): This paragraph names the Initial Study/ Mitigated Negative Declaration (SCH 2021070094) that includes the mitigation measure required to mitigate identified impacts to a less-than-significant impact. This paragraph is necessary to provide the direct reference to another document which prescribes measures for compliance.

749.14(a)(3): This paragraph names the Coastal Development Permit issued by the California Coastal Commission issued in July 2023 that includes the terms, conditions, and measures required for compliance with the Project breaking ground in the coastal zone. This paragraph is necessary to provide the direct reference to an additional document that prescribes measures for compliance.

749.14(a)(4): This paragraph requires that the County provide Department staff with copies of required reports or notices pursuant to the USFWS Biological Opinion, Incidental Take Statement, and final HMMP. An email address is provided for Department (Habitat Conservation Planning) staff to receive the reports. This paragraph is necessary to ensure that the County keeps Department staff informed of Project developments and status as it relates to CESA compliance so that the Department can monitor progress of the construction, adherence to mitigation measures, and overall compliance with the regulation.

749.14(a)(5): This paragraph requires a blanket compliance with all other laws and regulations to make clear that there are no other exemptions for take granted aside from those specified in this section. This sentence is necessary to make clear that there are no other exemptions for any other state laws or regulations granted with this exemption from the CESA take prohibition.

749.14(b): This subsection states that no general project or activity approval is granted by the proposed regulation. This paragraph is necessary to make it clear to the project proponent that they are fully responsible for project approvals by other agencies and that this regulation, in and of itself, does not convey those other approvals.

(b) Goals and Benefits of the Regulation

The goal of this regulation is to allow the County to proceed with its project to replace the South Bay Boulevard Bridge so that the bridge meets current seismic design and safety standards. The County is going out to bid for construction between summer and fall 2025. This project, while not an emergency, has strict timelines for compliance and to ensure that construction can commence for public safety reasons. The Department considers the restoration and mitigation measures laid out in the HMMP to adequately compensate for impacts to Morro manzanita from the South Bay Boulevard Bridge project. This regulation benefits the County by allowing them to proceed with the South Bay Boulevard Bridge project and may benefit Morro manzanita by creating a Morro manzanita mitigation site which, if successfully implemented, will increase the total area occupied by Morro manzanita.

(c) Authority and Reference Sections from Fish and Game Code for Regulation

Authority cited: Sections 399 and 2084, Fish and Game Code. Reference: Sections 399 and 2084, Fish and Game Code.

(d) Specific Technology or Equipment Required by Regulatory Change: None

(e) Identification of Reports or Documents Supporting Regulation Change

California Coastal Commission, Coastal Development Permit 3-22-0826, Issued to San Luis Obispo County Public Works Department, for South Bay Boulevard Bridge (July 17, 2023).

California Department of Fish and Wildlife (CDFW). 2024. Report to the Fish and Game Commission, petition evaluation for Morro manzanita (*Arctostaphylos morroensis*). California Natural Resources Agency, Sacramento CA. 16 pp. Available from: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=227348&inline>

San Luis Obispo County, Public Works Department, 2021. South Bay Boulevard Bridge Replacement Project Mitigated Negative Declaration – SCH 2021070094 adopted 8-24-2021 Available from <https://www.slocounty.ca.gov/departments/public-works/forms-documents/environmental-determinations/south-bay-boulevard-bridge-mnd>

San Luis Obispo County, Public Works Department, 2024. South Bay Boulevard Bridge Replacement Project Habitat Mitigation and Monitoring Plan. February 2024 draft.

U.S. Fish and Wildlife Service, 2022. Biological Opinion on South Bay Boulevard Bridge Replacement Project, San Luis Obispo County, California, 2022-0025695-S7

(f) Public Discussions of Proposed Regulations Prior to Notice Publication

The public receipt of petition occurred at the Commission's August 14-15, 2024 meeting. The Commission approved Department's request for 30-day extension October 9-10, 2024. The Commission received Department's 90-day evaluation report dated November 14, 2024 . The discussion to determine whether the petitioned action may be warranted was heard at the Commission's February 12-13, 2025 meeting. At the February 2025 meeting, Supervisor Gibson presented concerns regarding the potential listing of Morro manzanita. To allow time for the Department to have conversations with the county about its concerns and to allow the county additional time to bring certain information to the attention of the Commission, the "may be warranted" decision was postponed until the April 16-17, 2025 meeting. A verbal update regarding a path forward for the county was presented at the April 2025 meeting.

IV. Description of Reasonable Alternatives to Regulatory Action

(a) Alternatives to Regulation Change

Another means to allow take of CESA candidate species is by Incidental Take Permit (ITP) pursuant to FGC Section 2081, subdivision (b), from the Department. An ITP allows a permittee to take CESA listed or candidate species if such taking is incidental to, and for the purpose of, carrying out an otherwise lawful activity. However, issuance of ITPs falls under Department authority and involves a more lengthy permit approval process, which is not feasible given this is an approximately \$30 million infrastructure project, and all other project approvals are in place, and serves to replace a critical transportation corridor in the Morro Bay and Los Osos community for safety reasons.

(b) No Change Alternative

Without the proposed changes, the County would risk being in violation of CESA for the candidacy of Morro manzanita. Failure to adopt the proposed regulation could force the County to pursue taking Morro manzanita via the ITP process. Pursuing an ITP through the Department is more costly and time consuming than the discretionary take approach proposed by these regulations and would add costs to and delay the Project.

V. Mitigation Measures Required by Regulatory Action

The proposed regulatory action is consistent with the mitigation and reinforces the terms, conditions and measures authorized by the USFWS Biological Opinion, the Initial Study/Mitigated Negative Declaration, the HMMP, and the Coastal Development Permit.

## VI. Impact of Regulatory Action

The potential for significant statewide adverse economic impacts that might result from the proposed regulatory action has been assessed, and the following initial determinations relative to the required statutory categories have been made:

(a) Significant Statewide Adverse Economic Impact Directly Affecting Businesses, Including the Ability of California Businesses to Compete with Businesses in Other States

The Commission does not anticipate any adverse economic impacts to businesses that would affect their ability to compete with businesses from other states as a result of these regulations to allow for the discretionary take of Morro Manzanita. The proposed regulations impose no costs that would create an adverse economic impact.

(b) Impact on the Creation or Elimination of Jobs Within the State, the Creation of New Businesses or the Elimination of Existing Businesses, or the Expansion of Businesses in California; Benefits of the Regulation to the Health and Welfare of California Residents, Worker Safety, and the State's Environment

The Commission does not anticipate any adverse cost impacts to the creation or elimination of jobs within the state, the creation or elimination of businesses within the state, or the expansion of businesses within the state as a result of these regulations to allow for the discretionary take of Morro Manzanita.

(c) Cost Impacts on a Representative Private Person or Business

The Commission does not anticipate any adverse cost impacts to a representative private person or business within the state as a result of these regulations to allow for the discretionary take of Morro Manzanita. There are no anticipated costs or reporting requirements imposed by the allowance for discretionary take that would affect a private person or business.

(d) Costs or Savings to State Agencies or Costs/Savings in Federal Funding to the State:

The Commission does not anticipate any costs or savings to state agencies or any costs or savings in Federal Funding to the State as a result of these regulations to allow for the discretionary take of Morro Manzanita. There are no anticipated changes in enforcement activities for the Department or other state agencies that would increase costs, nor are there any fees that would increase revenue.

Failure to adopt, however, would force San Luis Obispo County to pursue taking Morro Manzanita via the Incidental Take Permit (ITP) process. The approximately \$47,000 for the CDFW ITP Application fee with Complexity Fee would cover most of the Department's costs for processing the permit application; however, this would still leave the Department with a deficit of approximately \$12,359.68 that would need to be absorbed in the existing budget.



## (e) Nondiscretionary Costs/Savings to Local Agencies:

While the Commission does not anticipate any nondiscretionary costs or savings to local agencies as a result of the proposed regulations, failure to adopt them could force the County to pursue taking Morro Manzanita via the Incidental Take Permit (ITP) process, which is more costly and time consuming than the discretionary take approach proposed by these regulations. The ITP process would add costs of approximately \$5.342 million to the County's project and would delay the \$30 million infrastructure project to improve the seismic safety of the Morro Bay and Los Osos transportation corridor. The \$5.342 million breaks down to the following:

- Approximately \$47,000 for the CDFW ITP Application fee with Complexity Fee
- Approximately \$5.295 million for CDFW required security for Habitat Management Lands Mitigation
- Lake and Streambed Standard Agreement fee of approximately \$6,698

Additionally, County staff indicate that failing to adhere to the project's current timeline due to a delay would cost the project \$27 million in programmed Federal funding, as well as increase the costs of the project by approximately \$5.45 million. The cost increase associated with a 3-year delay would be as follows:

- Inflationary cost increases: 4.89% of \$33 Million for 3 years equaling approximately \$5.1 million
- Project manager labor costs to coordinate Federal funding revisions and to coordinate project revisions: \$90,000
- Environmental consulting labor costs to update permits, agency authorizations, and update environmental commitment record: \$80,000
- Consultant costs to update plans and specifications to latest Caltrans versions: \$180,000

Combined total cost impact to the County from failing to adopt these regulations would be approximately \$10.792 million.

## (f) Programs Mandated on Local Agencies or School Districts: None

## (g) Costs Imposed on Any Local Agency or School District that is Required to be Reimbursed Under Part 7 (commencing with Section 17500) of Division 4, Government Code: None

## (h) Effect on Housing Costs: None

## VII. Economic Impact Assessment

## (a) Effects of the Regulation on the Creation or Elimination of Jobs Within the State

The Commission does not anticipate any adverse cost impacts to the creation or elimination of jobs within the state as a result of these regulations to allow for the discretionary take of Morro manzanita. Failure to adopt these regulations, however, could lead to the county pursuing ITPs, which could directly cost the project and

potentially cause the County to delay the bidding process for the project and affect contracted jobs.

(b) Effects of the Regulation on the Creation of New Businesses or the Elimination of Existing Businesses Within the State

The Commission does not anticipate any adverse cost impacts to the creation or elimination of businesses within the state, or the expansion of businesses within the state as a result of these regulations to allow for the discretionary take of Morro manzanita.

(c) Effects of the Regulation on the Expansion of Businesses Currently Doing Business Within the State

The Commission does not anticipate any adverse cost impacts to the creation or elimination of businesses within the state, or the expansion of businesses within the state as a result of these regulations to allow for the discretionary take of Morro manzanita.

(d) Benefits of the Regulation to the Health and Welfare of California Residents

The Commission does not anticipate impacts on the health and welfare of California residents.

(e) Benefits of the Regulation to Worker Safety

The Commission does not anticipate impacts to worker safety as a result of the proposed regulations.

(f) Benefits of the Regulation to the State's Environment

The Commission anticipates benefits to the state's environment by allowing the County of San Luis Obispo to proceed with the South Bay Boulevard Bridge project and may benefit Morro manzanita by creating a mitigation site which, if successfully implemented, will increase the total area occupied by Morro manzanita. The project also prompted the County Public Works Department to conduct a seed germination study for Morro manzanita as part of the mitigation requirements, further contributing to the scientific research for propagation of this rare species.

(g) Other Benefits of the Regulation

None.

## Informative Digest/Policy Statement Overview

Unless otherwise specified, all section references in this document are to Title 14 of the California Code of Regulations (CCR).

Morro manzanita (*Arctostaphylos morroensis*) is an erect, evergreen shrub in the heath family (Ericaceae). Morro manzanita is restricted to the northeast side of Morro Bay to the southern end of Montana de Oro State Park, a distance of less than ten miles, and occurs primarily on stabilized sand dunes associated with Baywood fine sand. Approximately 75 percent of its historical habitat has been converted for residential use, resulting in highly fragmented populations.

Morro manzanita has been listed under the Federal Endangered Species Act (ESA) as threatened since 1994. On July 20, 2024, the Fish and Game Commission (Commission) received a petition to list Morro manzanita as an endangered species under the California Endangered Species Act (CESA). Based upon the information contained in the petition and other relevant information, the Department determined that there is sufficient scientific information available to indicate that the petitioned action may be warranted and recommended that the Commission accept the petition for further consideration pursuant to CESA. On April 16, 2025, the Commission determined that listing may be warranted pursuant to Section 2074.2, Fish and Game Code. Morro manzanita became a candidate species under CESA, effective upon publication of the notice of findings on May 16, 2025 (Office of Administrative Law notice number Z2025-0505-03). With the one-year status review pursuant to Section 2074.6, Fish and Game Code, the Commission makes a final determination whether the petitioned action to list the species as threatened or endangered is warranted.

Under Section 2084, Fish and Game Code, CESA provides that the Commission may adopt regulations to authorize take of candidate species, based on the best available scientific information, when the take is otherwise consistent with CESA.

#### San Luis Obispo County Public Works Project

The County of San Luis Obispo proposes to replace the South Bay Boulevard Bridge (No. 49C-0351) ("Project") which spans Los Osos Creek so that it meets current seismic design standards and maintains safe, reliable service of a critical access corridor for the Los Osos and Morro Bay communities. The new bridge and road approaches will be relocated to the east side of the existing bridge to preserve access during construction, and then the existing bridge will be demolished once the new bridge is open for use.

Environmental review has completed on the Project, and it is going out to bid for construction to start in early 2026.

- An Initial Study/ Mitigated Negative Declaration was prepared by the Public Works Department of San Luis Obispo County (SCH 2021070094) and adopted by the County in August of 2021, which calls for a mitigation monitoring plan strategy, and specifies mitigation measures for biological resources.

- The County has been updating a Habitat Mitigation and Monitoring Plan (HMMP) since its original draft (November 2020) to consolidate the project impacts for federal, state, and county jurisdictional requirements from the Project.
- The California Coastal Commission is currently extending its authorization via the Coastal Development Permit 3-22-0826, Issued to San Luis Obispo County Public Works Department, for South Bay Boulevard Bridge (July 17, 2023).
- Biological Opinion issued by U.S. Fish and Wildlife Service for the South Bay Boulevard Bridge Replacement Project, San Luis Obispo County, California, 2022-0025695-S7

#### Proposed Regulations

The proposed addition of Section 749.14 to Title 14, CCR aims to create a special order allowing take of Morro manzanita during the CESA candidacy process for the described Project and lists the prerequisites for compliance for the exemption from the take prohibition to be granted. Additionally the regulation states that no project or activity approval is granted by the proposed regulation.

#### Benefit of the Regulations:

The creation of the Morro manzanita mitigation site will be a benefit to recovery by increasing the total area occupied by Morro manzanita within its range by 0.48 acre. The restoration and mitigation areas will be managed under the HMMP finalized in collaboration with the Service. Further, the County will be developing and documenting improved techniques for removal, storage, and reinstallation of Morro manzanita individuals. More knowledge about Morro manzanita preservation and propagation will be a valuable tool to offset future impacts to Morro manzanita throughout its range and support its recovery

#### Consistency and Compatibility with Existing Regulations:

The proposed regulations are neither inconsistent nor incompatible with existing state regulations. Section 20, Article IV, of the state Constitution specifies that the Legislature may delegate to the Commission such powers relating to the protection and propagation of fish and wildlife as the Legislature sees fit. The Legislature has delegated to the Commission the power to adopt regulations governing the candidacy of species under CESA (California Fish and Game Code sections 2080 *et seq.*). No other state agency has the authority to adopt regulations governing exemption from the take prohibition of candidate species under CESA. The Commission has reviewed its own regulations and finds that the proposed regulations are neither inconsistent nor incompatible with existing state regulations. The Commission has searched the CCR for any regulations regarding the adoption of regulations for the exemption from the take prohibition from CESA; therefore, the Commission has concluded that the proposed regulations are neither inconsistent nor incompatible with existing state regulations.

### Proposed Regulatory Language

749.14, Title 14, California Code of Regulations, is added to read:

**§749.14 Take of Morro Manzanita (*Arctostaphylos morroensis*) During Candidacy Period.**

- (a) The commission authorizes the take of Morro manzanita during the candidacy period for the South Bay Boulevard Bridge Replacement Project in San Luis Obispo County, California, and accompanying mitigation and restoration actions, provided that the County of San Luis Obispo does all of the following:
  - (1) Implements and adheres to all terms, conditions, and measures in the Biological Opinion, Incidental Take Statement (2022-0025695-S7) dated April 25, 2022, and final Habitat Mitigation and Monitoring Plan for the South Bay Boulevard Bridge Replacement Project, San Luis Obispo County, California;
  - (2) Implements and adheres to all terms, conditions, and measures in the initial study/mitigated negative declaration for the South Bay Boulevard Bridge Replacement Project, ED20-217 (300455) (SCH 2021070094) dated April 2019;
  - (3) Implements and adheres to all terms and conditions, including standard and special conditions, in Coastal Development Permit CDP 3-22-0826 for the South Bay Boulevard Bridge Replacement Project, issued July 17, 2023; and
  - (4) Provide the department, by emailing [NativePlants@wildlife.ca.gov](mailto:NativePlants@wildlife.ca.gov), with copies of all reports and notices relating to Morro manzanita that it is required to provide to the United States Fish and Wildlife Service pursuant to the Biological Opinion, Incidental Take Statement (2022-0025695-S7), and the final Habitat Mitigation and Monitoring Plan for the South Bay Boulevard Bridge Replacement Project, San Luis Obispo County, California;
- (b) Nothing in this section is intended to be nor shall be construed to be a general project or activity approval. It shall be the responsibility of the County of San Luis Obispo to obtain all necessary permits and approvals and to comply with all applicable federal, state, and local laws.

Note: Authority cited: Section 2084, Fish and Game Code. Reference: Section 2084, Fish and Game Code.



**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

STD. 399 (Rev. 10/2019)

**ECONOMIC IMPACT STATEMENT**

|                                                                                                                                              |                                          |                                        |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------|-----------------------------------------|
| DEPARTMENT NAME<br><b>California Fish and Game Commission</b>                                                                                | CONTACT PERSON<br><b>Dixie Van Allen</b> | EMAIL ADDRESS<br><b>fgc@fgc.ca.gov</b> | TELEPHONE NUMBER<br><b>916 201-6201</b> |
| DESCRIPTIVE TITLE FROM NOTICE REGISTER OR FORM 400<br><b>Add Section 749.14, Title 14, CCR, Re: Take of Morro Manzanita During Candidacy</b> |                                          |                                        | NOTICE FILE NUMBER<br><b>Z</b>          |

**A. ESTIMATED PRIVATE SECTOR COST IMPACTS** *Include calculations and assumptions in the rulemaking record.*

1. Check the appropriate box(es) below to indicate whether this regulation:

- |                                                                          |                                                                         |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> a. Impacts business and/or employees | <input type="checkbox"/> e. Imposes reporting requirements              |
| <input type="checkbox"/> b. Impacts small businesses                     | <input type="checkbox"/> f. Imposes prescriptive instead of performance |
| <input type="checkbox"/> c. Impacts jobs or occupations                  | <input checked="" type="checkbox"/> g. Impacts individuals              |
| <input type="checkbox"/> d. Impacts California competitiveness           | <input type="checkbox"/> h. None of the above (Explain below):          |

*If any box in Items 1 a through g is checked, complete this Economic Impact Statement.**If box in Item 1.h. is checked, complete the Fiscal Impact Statement as appropriate.*2. The California Fish and Game Commission estimates that the economic impact of this regulation (which includes the fiscal impact) is:  
(Agency/Department)

- ☒ Below \$10 million
- ☐ Between \$10 and \$25 million
- ☐ Between \$25 and \$50 million
- ☐ Over \$50 million *[If the economic impact is over \$50 million, agencies are required to submit a [Standardized Regulatory Impact Assessment](#) as specified in Government Code Section 11346.3(c)]*

3. Enter the total number of businesses impacted: \_\_\_\_\_

Describe the types of businesses (Include nonprofits): Construction contractors, individual parcel owners near bridge project.

Enter the number or percentage of total businesses impacted that are small businesses: \_\_\_\_\_

4. Enter the number of businesses that will be created: 0 eliminated: 0Explain: No effects on businesses from regulation's adoption, but failure to adopt could delay bidding process for project.5. Indicate the geographic extent of impacts: ☒ Statewide  
☐ Local or regional (List areas): \_\_\_\_\_6. Enter the number of jobs created: \_\_\_\_\_ and eliminated: 0Describe the types of jobs or occupations impacted: The county has not yet put out contracts for the bridge project yet, and is waiting for the regulations to pass before putting out bids. Without the regulations, the bidding process will be delayed and may impact jobs.7. Will the regulation affect the ability of California businesses to compete with other states by making it more costly to produce goods or services here? ☐ YES ☒ NOIf YES, explain briefly: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

STD. 399 (Rev. 10/2019)

**ECONOMIC IMPACT STATEMENT (CONTINUED)****B. ESTIMATED COSTS** *Include calculations and assumptions in the rulemaking record.*

1. What are the total statewide dollar costs that businesses and individuals may incur to comply with this regulation over its lifetime? \$ 0
- a. Initial costs for a small business: \$ 0 Annual ongoing costs: \$ 0 Years: 3
- b. Initial costs for a typical business: \$ 0 Annual ongoing costs: \$ 0 Years: 3
- c. Initial costs for an individual: \$ 0 Annual ongoing costs: \$ 0 Years: 3
- d. Describe other economic costs that may occur: \_\_\_\_\_

2. If multiple industries are impacted, enter the share of total costs for each industry: Only construction industry in this county is affected, as the bridge project could be delayed if these regulations are not adopted.

3. If the regulation imposes reporting requirements, enter the annual costs a typical business may incur to comply with these requirements. Include the dollar costs to do programming, record keeping, reporting, and other paperwork, whether or not the paperwork must be submitted. \$ \_\_\_\_\_

4. Will this regulation directly impact housing costs? ☐ YES ☒ NO

If YES, enter the annual dollar cost per housing unit: \$ \_\_\_\_\_

Number of units: \_\_\_\_\_

5. Are there comparable Federal regulations? ☒ YES ☐ NO

Explain the need for State regulation given the existence or absence of Federal regulations: While Morro Manzanita is protected by ESA, as a candidate species under CESA it needs state take authorization, which the proposed regulations provide in the form of discretionary take.

Enter any additional costs to businesses and/or individuals that may be due to State - Federal differences: \$ 0

**C. ESTIMATED BENEFITS** *Estimation of the dollar value of benefits is not specifically required by rulemaking law, but encouraged.*

1. Briefly summarize the benefits of the regulation, which may include among others, the health and welfare of California residents, worker safety and the State's environment: The goal of this regulation is to allow the County to proceed with its project to replace the South Bay Boulevard Bridge so that the bridge meets current seismic design and safety standards. The Department considers the restoration and mitigation measures to adequately compensate for impacts to Morro manzanita from the South Bay Boulevard Bridge project, and may benefit Morro manzanita by creating a mitigation site which may increase the total area occupied by Morro manzanita.

2. Are the benefits the result of: ☐ specific statutory requirements, or ☒ goals developed by the agency based on broad statutory authority?

Explain: FGC Section 2084 allows for take of a candidate species where necessary and consistent with CESA.

3. What are the total statewide benefits from this regulation over its lifetime? \$ 0

4. Briefly describe any expansion of businesses currently doing business within the State of California that would result from this regulation: The Commission does not anticipate any adverse cost impacts to the creation or elimination of businesses within the state, or the expansion of businesses within the state as a result of these regulations to allow for the discretionary take of Morro Manzanita. Contractors for the county have already anticipated the bridge project and have planned accordingly.

**D. ALTERNATIVES TO THE REGULATION** *Include calculations and assumptions in the rulemaking record. Estimation of the dollar value of benefits is not specifically required by rulemaking law, but encouraged.*

1. List alternatives considered and describe them below. If no alternatives were considered, explain why not: The county could pursue an Incidental

Take Permit (ITP) to take CESA listed or candidate species if such taking is incidental to, and for the purpose of, carrying out an otherwise lawful activity, such as this bridge project. However, issuance of ITPs from the Department is a more lengthy

and costly permit approval process, which is not feasible given this is an approximately \$30 million infrastructure project with project approvals in place, and serves to replace a critical transportation corridor in the Morro Bay and Los Osos community for safety reasons.

**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

STD. 399 (Rev. 10/2019)

**ECONOMIC IMPACT STATEMENT (CONTINUED)**

2. Summarize the total statewide costs and benefits from this regulation and each alternative considered:

Regulation: Benefit: \$ 0 Cost: \$ 0

Alternative 1: Benefit: \$ 0 Cost: \$ 0

Alternative 2: Benefit: \$ 0 Cost: \$ 0

3. Briefly discuss any quantification issues that are relevant to a comparison of estimated costs and benefits for this regulation or alternatives:

Econ. impacts from delaying the project due to failure to adoptthe regulations are difficult to quantify, as the delay would primarily affect the costs of the project to the county and would not necessarily impose economic impacts to businesses or private persons.

4. Rulemaking law requires agencies to consider performance standards as an alternative, if a regulation mandates the use of specific technologies or equipment, or prescribes specific actions or procedures. Were performance standards considered to lower compliance costs?

☐ YES☒ NO

Explain: Performance standards were not considered as they would not allow the project to move forward without a CESA violation, as would be allowed under the proposed regulations for the discretionary take of Morro Manzanita.

**E. MAJOR REGULATIONS** *Include calculations and assumptions in the rulemaking record.*

***California Environmental Protection Agency (Cal/EPA) boards, offices and departments are required to submit the following (per Health and Safety Code section 57005). Otherwise, skip to E4.***

1. Will the estimated costs of this regulation to California business enterprises **exceed \$10 million**? ☐ YES ☐ NO***If YES, complete E2. and E3******If NO, skip to E4***

2. Briefly describe each alternative, or combination of alternatives, for which a cost-effectiveness analysis was performed:

Alternative 1: \_\_\_\_\_

Alternative 2: \_\_\_\_\_

*(Attach additional pages for other alternatives)*

3. For the regulation, and each alternative just described, enter the estimated total cost and overall cost-effectiveness ratio:

Regulation: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

Alternative 1: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

Alternative 2: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

4. Will the regulation subject to OAL review have an estimated economic impact to business enterprises and individuals located in or doing business in California exceeding \$50 million in any 12-month period between the date the major regulation is estimated to be filed with the Secretary of State through 12 months after the major regulation is estimated to be fully implemented?

☐ YES☒ NO

*If YES, agencies are required to submit a Standardized Regulatory Impact Assessment (SRIA) as specified in Government Code Section 11346.3(c) and to include the SRIA in the Initial Statement of Reasons.*

5. Briefly describe the following:

The increase or decrease of investment in the State: The Commission does not anticipate any adverse cost impacts or cost benefits that would materially affect investment in the state, materially affect investment in the state as a result of these regulations to allow for the discretionary take of Morro Manzanita. The take is specific to the South Bay Boulevard Bridge project and would not spur or decrease investment.

The incentive for innovation in products, materials or processes: None. The incidental take of Morro Manzanita for the South Bay Boulevard Bridge Project will not lead to any innovation, as the removal and replanting procedures for the species is established and unlikely to inspire innovation.

The benefits of the regulations, including, but not limited to, benefits to the health, safety, and welfare of California residents, worker safety, and the state's environment and quality of life, among any other benefits identified by the agency: This regulation benefits

the County by allowing them to proceed with the South Bay Boulevard Bridge project and may benefit Morro manzanita by creating a Morro manzanita mitigation site which, if successfully implemented, will increase the total area occupied by Morro manzanita.

**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

STD. 399 (Rev. 10/2019)

**FISCAL IMPACT STATEMENT****A. FISCAL EFFECT ON LOCAL GOVERNMENT** *Indicate appropriate boxes 1 through 6 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*

- ☐ 1. Additional expenditures in the current State Fiscal Year which are reimbursable by the State. (Approximate)  
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

\$ \_\_\_\_\_

- ☐ a. Funding provided in \_\_\_\_\_  
Budget Act of \_\_\_\_\_ or Chapter \_\_\_\_\_, Statutes of \_\_\_\_\_

- ☐ b. Funding will be requested in the Governor's Budget Act of \_\_\_\_\_  
Fiscal Year: \_\_\_\_\_

- ☐ 2. Additional expenditures in the current State Fiscal Year which are NOT reimbursable by the State. (Approximate)  
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

\$ \_\_\_\_\_

*Check reason(s) this regulation is not reimbursable and provide the appropriate information:*

- ☐ a. Implements the Federal mandate contained in \_\_\_\_\_
- ☐ b. Implements the court mandate set forth by the \_\_\_\_\_ Court.

Case of: \_\_\_\_\_ vs. \_\_\_\_\_

- ☐ c. Implements a mandate of the people of this State expressed in their approval of Proposition No. \_\_\_\_\_

Date of Election: \_\_\_\_\_

- ☐ d. Issued only in response to a specific request from affected local entity(s).

Local entity(s) affected: \_\_\_\_\_  
\_\_\_\_\_

- ☐ e. Will be fully financed from the fees, revenue, etc. from: \_\_\_\_\_

Authorized by Section: \_\_\_\_\_ of the \_\_\_\_\_ Code;

- ☐ f. Provides for savings to each affected unit of local government which will, at a minimum, offset any additional costs to each;

- ☐ g. Creates, eliminates, or changes the penalty for a new crime or infraction contained in \_\_\_\_\_

- ☐ 3. Annual Savings. (approximate)

\$ \_\_\_\_\_

- ☐ 4. No additional costs or savings. This regulation makes only technical, non-substantive or clarifying changes to current law regulations.

- ☒ 5. No fiscal impact exists. This regulation does not affect any local entity or program.

- ☐ 6. Other. Explain \_\_\_\_\_  
\_\_\_\_\_

**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

STD. 399 (Rev. 10/2019)

**FISCAL IMPACT STATEMENT (CONTINUED)****B. FISCAL EFFECT ON STATE GOVERNMENT** *Indicate appropriate boxes 1 through 4 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*☐ 1. Additional expenditures in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

*It is anticipated that State agencies will:*☐ a. Absorb these additional costs within their existing budgets and resources.☐ b. Increase the currently authorized budget level for the \_\_\_\_\_ Fiscal Year☐ 2. Savings in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

☒ 3. No fiscal impact exists. This regulation does not affect any State agency or program.☐ 4. Other. Explain \_\_\_\_\_  
\_\_\_\_\_**C. FISCAL EFFECT ON FEDERAL FUNDING OF STATE PROGRAMS** *Indicate appropriate boxes 1 through 4 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*☐ 1. Additional expenditures in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

☐ 2. Savings in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

☒ 3. No fiscal impact exists. This regulation does not affect any federally funded State agency or program.☐ 4. Other. Explain \_\_\_\_\_  
\_\_\_\_\_

FISCAL OFFICER SIGNATURE

DATE

*The signature attests that the agency has completed the STD. 399 according to the instructions in SAM sections 6601-6616, and understands the impacts of the proposed rulemaking. State boards, offices, or departments not under an Agency Secretary must have the form signed by the highest ranking official in the organization.*

AGENCY SECRETARY

DATE

*Finance approval and signature is required when SAM sections 6601-6616 require completion of Fiscal Impact Statement in the STD. 399.*

DEPARTMENT OF FINANCE PROGRAM BUDGET MANAGER

DATE





STD. 399 Addendum

Add Section 749.14

Title 14, California Code of Regulations

Re: Take of Morro Manzanita During Candidacy

## Background

Morro manzanita has been listed under the Federal Endangered Species Act (ESA) as threatened since 1994. On July 20, 2024, the Fish and Game Commission (Commission) received a petition to list morro manzanita as an endangered species under the California Endangered Species Act (CESA). Based upon the information contained in the petition and other relevant information, the California Department of Fish and Wildlife (Department/CDFW) determined that there is sufficient scientific information to indicate the petition action may be warranted and recommended that the Commission accept the petition for further consideration pursuant to CESA. On April 16, 2025, the Commission determined that listing may be warranted pursuant to Section 2074.2, Fish and Game Code. On May 16, 2025 a Morro manzanita became a candidate species under CESA effective upon publication of the notice of findings in the California Regulatory Notice Register.

Under Section 2084, Fish and Game Code, CESA provides that the Commission may adopt regulations to authorize take of candidate species, based on the best available scientific information, when the take is otherwise consistent with CESA.

### San Luis Obispo County Public Works Project

The County of San Luis Obispo (the County) proposes to replace the South Bay Boulevard Bridge (No. 49C-0351) (Project) which spans Los Osos Creek so that it meets current seismic design standards and maintains safe, reliable service of a critical access corridor for the Los Osos and Morro Bay communities.

Environmental review was completed for the Project, and the County it is going out to bid for construction to start in early 2026.

### Proposed Regulations

The proposed addition of Section 749.14 to Title 14, CCR aims to create a special order allowing take of Morro manzanita during the CESA candidacy process for the described Project.

## Economic Impact Statement

### Section A. Estimated Private Sector Cost Impacts

Question 4. Number of businesses that will be created or eliminated.

The Commission does not anticipate any adverse cost impacts to the creation or elimination of businesses within the state, or the expansion of businesses within the state as a result of these regulations to allow for the discretionary take of Morro manzanita. While the County has yet to accept bids for contractors for the project, it is unlikely that new construction firms would be

created to bid on the work due to the high capital requirements of establishing those types of firms, and the project will ultimately go to existing firms.

Question 6. Number of jobs that will be created or eliminated.

The Commission does not anticipate any adverse cost impacts to the creation or elimination of jobs within the state as a result of these regulations to allow for the discretionary take of Morro manzanita. However, failure to adopt these regulations could lead to the County pursuing Incidental Take Permits (ITPs), which could directly cost the project and potentially cause the county to delay the bidding process for the project and affect contracted jobs. It is difficult to quantify the number of jobs that would be affected because the County has not yet accepted bids for contractors yet, but due to the necessity of having a seismically stable bridge the project will go through regardless of adoption, so it could be argued that while bidding could be delayed the jobs will ultimately remain unchanged.

### Section B. Estimated Costs

Question 1. What are the total statewide dollar costs that businesses and individuals may incur to comply with this regulation over its lifetime?

None. The proposed regulations to allow for the discretionary take of Morro Manzanita should not materially affect any businesses or individuals, as they do not introduce any fees or other costs that a representative private person or business would be mandated to pay.

### Section C. Estimated Benefits

**Question 1. Briefly summarize the benefits of the regulation.**

The goal of this regulation is to allow the County to proceed with its project to replace the South Bay Boulevard Bridge so that the bridge meets current seismic design and safety standards. The Department considers the restoration and mitigation measures laid out in the HMMP to adequately compensate for impacts to Morro manzanita from the Project. This regulation benefits the County by allowing them to proceed with the Project and may benefit Morro manzanita by creating a mitigation site which, if successfully implemented, will increase the total area occupied by Morro manzanita.

Question 3. What are the total statewide benefits from this regulation over its lifetime?

The direct statewide economic benefits of the project are \$0, as the discretionary take of Morro manzanita will not create any savings statewide for businesses or individuals.

Question 4. Briefly describe any expansion of businesses currently doing business within the State of California that would result from this regulation.

The Commission does not anticipate any adverse cost impacts to the creation or elimination of businesses within the state, or the expansion of businesses within the state as a result of these regulations to allow for the discretionary take of Morro manzanita. The take of the species would not constitute a reason for any businesses to expand or contract their operations, and the indirect impact on the construction companies that the County is currently engaged with for this project is unlikely to cause them to expand, as they generally must be large enough to take on such an endeavor in order to compete for the bid.

## Section D. Alternatives to the Regulation

Question 1. List all alternatives considered and describe them below. If no alternatives were considered, explain why not:

Another means to allow take of CESA candidate species is by Incidental ITPs pursuant to FGC Section 2081, subdivision (b), from the Department. An ITP allows a permittee to take CESA listed or candidate species if such taking is incidental to, and for the purpose of, carrying out an otherwise lawful activity, including for research or monitoring activities of such activity. However, issuance of ITPs falls under Department authority and involves a more lengthy and costly permit approval process, which is not feasible given this is an approximately \$30 million infrastructure project, and all other project approvals are in place, and serves to replace a critical transportation corridor in the Morro Bay and Los Osos community for safety reasons. The ITP process would add costs of approximately \$5.342 million to the County's project and would delay the \$30 million infrastructure project by approximately three years, which would further increase the project costs to the County by approximately \$5.45 million (see Section A of the Fiscal Impact Statement).

Without the proposed changes, the County would risk being in violation of CESA for the candidacy of Morro Manzanita.

### **Fiscal Impact Statement**

#### A. Fiscal Effect on Local Government

Answer 5. Explain:

The adoption of the regulation will not have any fiscal effect on local governments; however, while the Commission does not anticipate any nondiscretionary costs or savings to local agencies as a result of the proposed regulations, failure to adopt them could force the County to pursue taking Morro manzanita via the ITP process. Pursuing an ITP through the Department is more costly and time consuming than the discretionary take approach proposed by these regulations and would add costs to and delay the \$30 million infrastructure project to improve the seismic safety of the Morro Bay and Los Osos transportation corridor. The ITP process would add costs of approximately \$5.342 million to the County's project and would delay the \$30 million infrastructure project to improve the seismic safety of the Morro Bay and Los Osos transportation corridor. The \$5.342 million breaks down to the following:

- Approximately \$47,000 for the CDFW ITP Application fee with Complexity Fee
- Approximately \$5.295 million for CDFW required security for Habitat Management Lands Mitigation
- Lake and Streambed Standard Agreement fee of approximately \$6,698

Additionally, County staff indicate that failing to adhere to the Project's current timeline due to a delay would cost the project \$27 million in programmed Federal funding, as well as increase the costs of the project by approximately \$5.45 million. The cost increase associated with a 3-year delay would be as follows:

- Inflationary cost increases: 4.89% of \$33 Million for 3 years = approximately \$5.1 million

- Project manager labor costs to coordinate Federal funding revisions and to coordinate project revisions: \$90,000
- Environmental consulting labor costs to update permits, agency authorizations, and update environmental commitment record: \$80,000
- Consultant costs to update plans and specifications to latest Caltrans versions: \$180,000

Combined total cost impact to the County from failing to adopt these regulations would be approximately \$10.792 million, in addition to the County losing out on \$27.

#### B. Fiscal Effect on State Government

Answer 3. No fiscal impact exists. This regulation does not affect any State agency or program:

This regulation will not affect any state agency or program if it is adopted. However, failure to adopt would force San Luis Obispo County to pursue taking Morro manzanita via the ITP process. The approximately \$47,000 for the CDFW ITP Application fee with Complexity Fee would cover most of the Department's costs for processing the permit application; however, this would still leave the Department with a deficit that would need to be absorbed in the existing budget. The costs are described in Table 1 below:

**Table 1: Estimated Costs to CDFW for ITP Processing**

| <b>Personal Services</b>                                                                | <b>Hourly Rate</b> | <b>CAL HR FY 2024/25<br/>FULL MAX<br/>MONTHLY SALARY</b> | <b>Estimated Hours</b> | <b>Totals</b>      |
|-----------------------------------------------------------------------------------------|--------------------|----------------------------------------------------------|------------------------|--------------------|
| Regional Manager                                                                        | \$117.89           | 20,748.00                                                | 8.00                   | <b>\$943.09</b>    |
| Environmental Program Manager Supervisory (Region and HCPB review time)                 | \$86.07            | 15,148.00                                                | 20.00                  | <b>\$1,721.36</b>  |
| Sr Environmental Scientist Supervisor (Region and HCPB)                                 | \$74.43            | 13,100.00                                                | 40.00                  | <b>\$2,977.27</b>  |
| Sr Environmental Scientist Specialist (Region and Habitat Conservation Planning Branch) | \$58.07            | 10,221.00                                                | 430.00                 | <b>\$24,971.76</b> |
| Associate Government Program Analyst (Admin support ITP)                                | \$42.89            | 7,549.00                                                 | 20.00                  | <b>\$857.84</b>    |

| <b>Personal Services</b>                                   | <b>Hourly Rate</b> | <b>CAL HR FY 2024/25<br/>FULL MAX<br/>MONTHLY SALARY</b> | <b>Estimated Hours</b> | <b>Totals</b>      |
|------------------------------------------------------------|--------------------|----------------------------------------------------------|------------------------|--------------------|
| Attorney III (Review time for CESA candidate ITP/HM Lands) | \$84.54            | 14,879.00                                                | 8.00                   | <b>\$676.32</b>    |
| CDFW Land Agent (HM Lands review and processing)           | \$51.49            | 9,063.00                                                 | 10.00                  | <b>\$514.94</b>    |
| <b>Total Salary &amp; Wages</b>                            |                    |                                                          |                        | \$32,662.59        |
| Staff Benefits-Permanent Staff (FY 2024-25) <sup>1</sup>   | 50.625%            |                                                          |                        | \$16,535.44        |
| <b>TOTAL PERSONAL SERVICES</b>                             |                    |                                                          |                        | <b>\$49,198.03</b> |
| <b>OVERHEAD - Indirect Costs<sup>3</sup> (FY 2024-25)</b>  | 20.68%             |                                                          |                        | <b>\$10,174.15</b> |
| <b>TOTAL COSTS TO CDFW</b>                                 |                    |                                                          |                        | <b>\$59,372.18</b> |

The costs of the ITP process for the county can be broken down in Table 2:

**Table 2: Costs to San Luis Obispo County from ITP Process**

|                                                                                           |                       |
|-------------------------------------------------------------------------------------------|-----------------------|
| <b>Costs to the County for ITP (does not include their staff time or consultant fees)</b> |                       |
| CDFW ITP Application fee with Complexity Fee max                                          | \$47,012.50           |
| CDFW required Security for Habitat Management Lands Mitigation                            | \$5,295,000.00        |
| Total Burden to County for ITP application/HM Lands Security                              | <b>\$5,342,012.50</b> |

The difference between the \$47,012.50 CDFW ITP Application fee with Complexity Fee and the costs of \$59,372.18 to the Department for ITP processing would leave the Department with approximately **\$12,359.68** in costs that would need to be absorbed by the Department's budget if these regulations are not adopted.





## United States Department of the Interior

### U.S. FISH AND WILDLIFE SERVICE

Ecological Services  
Ventura Fish and Wildlife Office  
2493 Portola Road, Suite B  
Ventura, California 93003



IN REPLY REFER TO:  
2022-0025695-S7

April 25, 2022

Barrett Holland  
District Biologist  
California Department of Transportation, District 5  
50 Higuera Street  
San Luis Obispo, California 93401

Subject: Biological Opinion on South Bay Boulevard Bridge Replacement Project, San Luis Obispo County, California

Dear Barrett Holland:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the California Department of Transportation's (Caltrans) proposed funding and oversight of the San Luis Obispo County's (County) replacement of South Bay Boulevard Bridge over Los Osos Creek (project) and its effects on the federally threatened California red-legged frog (*Rana draytonii*), the federally threatened Morro shoulderband snail (*Helminthoglypta walkeriana*), the federally endangered tidewater goby (*Eucyclogobius newberryi*), the federally threatened Morro manzanita (*Arctostaphylos morroensis*), and designated critical habitat for both the Morro shoulderband snail and the tidewater goby, in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.).

We received your request for formal consultation on October 20, 2021, via electronic mail. After reviewing your request, we sent you an electronic mail on November 24, 2021, informing you that we did not concur with your determination that the proposed action may affect, but is not likely to adversely affect the California red-legged frog. We received your December 27, 2021, request to initiate formal consultation on the proposed action's impacts to the California red-legged frog and for our concurrence that the proposed project meets the criteria for inclusion under the Programmatic Biological Opinion for Projects Funded or Approved under the Federal Highway Administration's Federal Aid Program (PBO) (Service 2011). We have based this biological opinion on information that accompanied your October 20, 2021, request for consultation, including the biological assessment (Caltrans 2021), the Mitigated Negative Declaration (SLO 2019), various correspondences, and information in our files.

**California Red-Legged Frog**

Under the administration of the PBO (Service 2011), you are required to notify us of project activities that may adversely affect the California red-legged frog and its designated critical habitat. Caltrans has assumed the Federal Highway Administration's (FHWA) responsibilities under the Act for this action in accordance with Section 1313, Surface Transportation Project Delivery Program, of the Moving Ahead for Progress in the 21st Century Act (MAP-21) of 2012, as described in the National Environmental Policy Act Assignment Memorandum of Understanding between FHWA and Caltrans (effective October 1, 2012) and codified in 23 U.S.C. 327. You have determined that the proposed action may affect and is likely to adversely affect the California red-legged frog and requested that such effects be addressed via the PBO. The project is not located within designated critical habitat for the species. Caltrans will implement all minimization measures described on pages 7 through 12 of the PBO.

The proposed project is discussed in detail in the project's biological assessment (Caltrans 2021) and below in the project description. Summarized briefly, Caltrans, in cooperation with the County, is proposing to replace the South Bay Boulevard Bridge (49C-0351) at Los Osos Creek with a new bridge.

You have determined that replacing the bridge on South Bay Boulevard at Los Osos Creek, as described in the biological assessment (Caltrans 2021), satisfies the four criteria outlined in the PBO for projects that are likely to result in adverse effects to the California red-legged frog, but would not affect the long-term viability of those populations. Project effects of this nature were analyzed in the PBO under the Effects of the Action section (Service 2011, pp. 29-34). You also propose to implement the measures outlined in the PBO for avoiding and minimizing effects to the California red-legged frog. Based on the information in your biological assessment (Caltrans 2021), the proposed project is consistent with, and appropriate for, inclusion under the PBO. Caltrans must implement all avoidance and minimization measures, reasonable and prudent measures, and terms and conditions of the PBO. You have requested our concurrence with your determination that the potential adverse effects of the proposed action on the California red-legged frog are appropriate for analysis under the PBO. We have reviewed the project activities and determined that the project is suitable for inclusion under the PBO. We will not discuss this species for the remainder of this biological opinion.

**BIOLOGICAL OPINION****DESCRIPTION OF THE PROPOSED ACTION**

The County, with oversight by Caltrans, proposes to replace the South Bay Boulevard Bridge (No. 49C-0351), which spans Los Osos Creek within unincorporated San Luis Obispo County, approximately 2,000 feet southeast of the City of Morro Bay, California. The bridge has been identified as seismically deficient. The bridge has been programmed to be replaced rather than retrofitted under the Highway Bridge Program, as replacement was identified as the most cost effective retrofit alternative. The project is funded by the FHWA as administered by Caltrans.

The County would replace the existing 189-foot long, 37-foot-wide bridge with a new 300-foot-long, 50-foot-wide bridge immediately east of the existing bridge. The proposed replacement bridge consists of a two-span concrete bridge on pile foundations with a center support pier. The replacement bridge deck would be widened to accommodate a pedestrian lane for public access and future extension of the California Coastal Trail along South Bay Boulevard. Approach lanes would be realigned within the minimum length necessary to meet the new bridge. The County would demolish the existing roadway approaches along with the existing bridge after construction of the new bridge and roadway approaches are complete and operational. The County also would remove the abandoned approach road sections, and those areas would be used for stormwater features and habitat mitigation areas. The primary mitigation area is a 0.4-acre area on Santa Ysabel Road that would be used for staging and storage during construction and converted to Morro manzanita chaparral as part of the mitigation strategy after construction has been completed. The project area is entirely within a County right-of-way, including all permanent and temporary impact areas and proposed habitat mitigation and restoration.

The County has divided the project into three phases: year 1, construction of new bridge; year 2, demolition of old bridge; and 5 years of habitat restoration, mitigation, maintenance and monitoring. Within the construction and demolition phases, activities are divided between dry season, June through October (22 weeks or 110 work days), and outside the dry season, November through June (30 weeks or up to 150 work days). Construction is estimated to take 30 months to complete and is estimated to commence in June 2022 (ending in November 2024) or June 2023 (ending in November 2025). However, the intended schedule to construct the new bridge in the first year and demolish the existing bridge in the second year may not be feasible given contractor approach and construction contingencies. All work below the high tide line in Los Osos Creek will be conducted during two consecutive dry seasons of 5 months duration, June 1 to October 31. Work in upland areas will take place outside the dry season, which will include implementation of wet weather minimization measures, as appropriate. All work will take place during daytime hours, unless special permission is acquired from the County engineer for night work necessary for critical work items on a case-by-case basis.

### **Proposed Mitigation**

To offset the effects to special status species and habitats, the County is proposing to restore temporary impacts at a 1:1 ratio, permanent impacts to Morro manzanita chaparral at a 3:1 ratio, and permanent impacts to oak woodland at a 4:1 ratio. All mitigation activities are proposed to occur within the action area and replace impacted habitats with native plant species. The mitigation activities proposed are:

- Drainage patterns and topography will be restored or improved to pre-project conditions.
- Temporary impact areas will be restored to pre-existing conditions by removing all structures (trestles, trestle piles, cofferdams) and restoring pre-existing substrate contours and vegetation by hydroseeding, container plants, or both.

- Temporary impacts to Morro manzanita chaparral will be restored to pre-existing contours, soil conditions, and vegetation using a combination of hydroseeding and container plants. The 33 Morro manzanita plants to be removed for construction access and staging will be stored during construction and replanted after construction.
- Permanent Morro manzanita chaparral impacts to 0.24 acre and 13 individual plants will be mitigated at a 3:1 mitigation ratio, requiring 0.72 acre and approximately 39 Morro manzanita plants.
- Oak woodland impacts include removal of trees with diameter at breast height (DBH) of 4 inches or more is anticipated to include 9 trees in the permanent impact footprint for the realigned approach roads and additional trees in the temporary construction disturbance area, for a total of 15 to 25 trees. Replacement plantings at a 4:1 replacement ratio would correspond to up to 100 replacement plantings. All plantings will occur within 1 acre in the action area.
- Weed control will be implemented using hand methods in the restoration and mitigation areas for 5 years.
- Maintenance and monitoring of restoration and mitigation areas will occur for 5 years. The County proposes to maintain at least 75 percent success of replaced plants in the restoration and mitigation areas.

#### General Conservation Measures

1. Prior to initiation of any construction activities, including vegetation clearing or grubbing, sturdy high visibility fencing will be installed to protect wetlands adjacent to designated work areas. This fencing will be placed to avoid unnecessary adverse impacts to these areas. No construction work (including storage of materials) will occur outside of the specified project limits. The fencing will remain in place during the entire construction period, be monitored periodically by a Service-approved biologist, and maintained as needed by the contractor.
2. Prior to any vegetation removal or ground disturbance, a Service-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a description of the special status species and their habitats, the specific measures that are being implemented to conserve the species for the project, and the boundaries within which the project may be accomplished. Brochures, books, and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions.
3. The Service-approved biologist will conduct pre-activity surveys for Morro shoulderband snails no more than 1 week prior to onset of initial ground disturbance activities within or adjacent to vegetation, including vegetation removal, materials and

equipment staging, and any earthwork. The survey process will involve moving and searching under all vegetation, and anthropogenic artifacts present (e.g., woodpiles, tires, debris), and will result in destruction or uprooting of vegetation. In addition, if any live snails are found during the preconstruction surveys, the Service-approved biologist will conduct daily Morro shoulderband snail pre-activity surveys at the beginning of each work day to check for and remove any Morro shoulderband snails. Pre-activity Morro shoulderband snail surveys will be conducted before work occurs during any day with rainy or wet weather. Morro shoulderband snails of any life stage will be captured and moved out of harm's way to a pre-approved receiver site. The size, age class, location of capture, and release site location will be recorded for each relocated Morro shoulderband snail. Empty shells will be noted on a map, counted, and classified by size and age and will be left in place.

4. Vegetation clearing will be done outside nesting bird season (February 1 to September 1). If it is not possible to avoid nesting season, preconstruction nesting bird surveys will be conducted by a qualified biologist experienced in bird identification and nest surveys, prior to the onset of work activities, including vegetation removal. If an active nest is detected during the preconstruction surveys, the qualified biologist will notify Caltrans and the California Department of Fish and Wildlife (CDFW) to coordinate the appropriate course of action required. Caltrans will contact the Service if the species is federally listed or protected under the Migratory Bird Treaty Act. In addition, any unoccupied nests (excluding raptors) found within the action area will be removed to discourage nesting. Demolition of the existing bridge will be scheduled to avoid the swallow nesting season, if feasible. Nesting swallows may use the existing bridge commencing in March or April. To deter swallows from nesting on the existing or new bridge, appropriate nesting deterrent methods will be implemented prior to the start of nesting season to deter active nesting during the proposed construction period (applicable to both construction and demolition construction phases). Nesting deterrents may include removal of unoccupied nests or installation of netting over appropriate nesting surfaces, or both.
5. Temporary erosion control measures (such as silt fences, sterile rice straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) will be employed for disturbed areas. Earth dikes, drainage swales, and ditches will be provided to intercept, divert, and convey surface runoff and sheet flow, prevent erosion, and reduce pollutant loading. Specific areas that may need such measures will be identified on the construction drawings.
6. All oils, fuels, and other toxicants spilled or deposited near the project site will be removed and disposed of according to applicable laws and regulations.
7. Fueling of machinery and equipment will be conducted only in designated upland areas that will prevent accidental spills from reaching the creek, wetlands, or other sensitive plant communities.



8. The topography of the equipment access route(s) will be restored when each construction phase is complete.
9. Native vegetation will be used to revegetate and stabilize affected stream banks and disturbed areas.
10. Standard dust control measures will be implemented to avoid excessive dust transported outside the action area.
11. Native grasses and vegetation will be established in areas disturbed by construction to minimize erosion as soon as possible after disturbance.
12. Erosion control and stabilization measures will be incorporated into road construction.
13. Temporary construction impact areas will be restored to pre-existing conditions as defined in the finalized Habitat Mitigation and Monitoring Plan (HMMP).
14. Authorization from the U.S. Army Corps of Engineers and a coastal development permit from the California Coastal Commission and the Local Coastal Program will be obtained prior to construction, and any additional minimization and avoidance measures provided in these permits will be implemented.

#### Measures for Aquatic Work for Water Quality and Tidewater Goby

1. Work below the mean high tide line will be limited to the work window June 1 to October 31 or as otherwise directed by the regulatory permits to minimize migratory fish presence, potential for precipitation events and associated runoff effects, increased creek flow, and potential for more extreme storm induced tide and wave conditions.
2. A qualified, Service-approved biologist will monitor installation of the approved dewatering containment system and all dewatering activities that could impact tidewater goby and their habitat.
3. Following installation of the approved dewatering containment system, the Service-approved biologist will use seines and dipnets to capture and translocate fishes and other aquatic organisms trapped within the containment area. All captured organisms will be immediately released into areas of the creek that will not be affected by dewatering.
4. All dewatering pump intakes will be screened with screening appropriate to exclude all life stages of tidewater goby from entrainment in the pumping system.
5. Dewatering operations will be halted periodically to allow the qualified Service-approved biologists to seine the exclusion area for additional trapped fishes and aquatic

organisms. All captured organisms will be immediately released into areas of the creek that will not be affected by dewatering.

6. Installation of the approved dewatering containment system will be conducted, to the greatest extent possible (detailed in M. Stillman, County of San Luis Obispo, pers. comm. 2022), at low tidal levels when water within the containment area is at minimal levels and fishes and other aquatic organisms may be in lower abundance.
7. Equipment will not be operated directly within tidal waters or the live Los Osos Creek channel. The containment system will be removed after work is completed.
8. Turbid water from construction activities in the creek will be contained and prevented from being transported in amounts that are deleterious to fish, or in amounts that could violate state pollution laws. Silt fences or other means will be used to contain sediment. If sediment is not being contained adequately, as determined by visual observation, the activity will cease.
9. Appropriate best management practices (including filtration, as appropriate) will be implemented to prevent the entry of excavated material, silt laden water, and other contaminants into the live creek channel. Due to the high salt content and other potential contaminants, water pumped from the containment area will not be deposited in upland areas. All potentially contaminated materials from the containment areas will be removed from the site and properly disposed of in compliance with State and Federal law.
10. The equipment access route to the streambed to install or remove temporary piles, construct the trestles and bridge components, and demolish the existing bridge will be selected to minimize disturbance of wetlands.
11. The access route within wetlands (salt marsh) will be covered with crane pads, plywood or similar materials to minimize rutting, vegetation trampling and other ground disturbance. These materials will be removed as soon as equipment access needs are complete.
12. Roads used during construction will be swept and cleaned of accumulated earth and debris in the construction zone during project construction, particularly before predicted rainfall events.
13. Excavated materials deposited or stored onsite temporarily, including sediment excavated from the creek bed, will not be placed in or adjacent to open water channels or wetlands and will be wetted and/or covered as necessary to prevent runoff and erosion.
14. A Spill Prevention Control and Countermeasure Plan (SPCCP) will be prepared for construction to minimize the potential for spills or leaks of fuels and other potentially

hazardous substances, and to provide maximum efficiency in response to and cleanup of any spills or leaks.

15. Bridge abutments will be designed to minimize disturbances to essential fish habitat and stream banks.
16. Sidecasting of road materials into Los Osos Creek will be prohibited.
17. In-water structures will be composed of clean materials and will be limited to the minimum necessary footprint to support construction activities.
18. Cofferdams will be designed to exclude anticipated high-water conditions plus an additional reasonable margin of safety.
19. Construction schedule will be managed to achieve removal of instream structures at the end of the dry season to the maximum extent possible.
20. Piles will not be installed using an impact hammer, except to test vertical pile capacity.
21. Hollow steel piles will not be used unless required to meet engineering requirements.
22. Peak sound pressure levels will be monitored during any driving of steel piles using an impact hammer.
23. If monitored sound pressure levels exceed 180 dB, additional measures will be implemented potentially including an air bubble curtain, dewatering the area using a cofferdam or use of a smaller hammer.
24. All temporary piles and old bridge piles will be removed completely, to the extent feasible.
25. Piles will be removed using a crane or vibratory hammer.
26. The project will obtain coverage under the General Permit for Storm Water Discharges associated with Construction and Land Disturbance Activities (Order no. 20120006DWQ), and a SWPPP will be prepared.
27. During construction, erosion control measures (e.g., silt fencing, fiber rolls, and barriers) will remain available on site and will be utilized as necessary to prevent erosion and sedimentation in wetland areas. No synthetic plastic mesh products will be used for erosion control and use of these materials on site is prohibited.
28. Erosion control measures will be checked to ensure that they are intact and functioning effectively and maintained on a weekly basis throughout the duration of construction.

29. The contractor will also apply adequate dust control techniques, such as site watering, during construction to protect water quality.
30. Groundwater discharged to Los Osos Creek from dewatering activities during the construction period will be allowed to settle in a temporary tank (or equivalent) prior to discharge and provided with erosion protection at the pipe outlet.
31. Dewatering discharge will be allowed to settle prior to discharge to the creek.
32. Drilling for the cast-in-drilled-hole piles will utilize a temporary steel casing installed to the full depth of the drill hole, if feasible.
33. If full length temporary casing is not feasible, steel casing will be installed to at least three feet below the ground surface.
34. Drilling will be monitored to detect any discharge of drilling fluid from the casing, streambed or adjacent areas.
35. Containment (washed gravel-filled bags wrapped in plastic sheeting, or equivalent) will be used at the drill hole to collect and contain any drilling fluid leakage and prevent any discharges to the streambed.
36. Absorbent material and disposal bags (or equivalent cleanup materials) will be maintained onsite to cleanup any drilling fluid spillage.
37. All spillage of drilling fluids (including residual solids) will be removed from the streambed and adjacent areas using cleanup materials.
38. Any discharge of drilling fluids to the streambed will be reported to Regional Water Quality Control Board, California Department of Fish and Wildlife, and the Service within 24 hours of discharge.

## ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

### **Jeopardy Determination**

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species.

“Jeopardize the continued existence of” means “to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the current rangewide condition of the Morro shoulderband snail, tidewater goby, and Morro manzanita, the factors responsible for that condition, and their survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the Morro shoulderband snail, tidewater goby, and Morro manzanita in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of species; (3) the Effects of the Action, which determines all consequences to the Morro shoulderband snail, tidewater goby, and Morro manzanita caused by the proposed action that are reasonably certain to occur in the action area; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities, that are reasonably certain to occur in the action area, on the Morro shoulderband snail, tidewater goby, and Morro manzanita.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the Morro shoulderband snail, tidewater goby, and Morro manzanita, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the Morro shoulderband snail, tidewater goby, and Morro manzanita in the wild by reducing the reproduction, numbers, and distribution of that species.

### **Adverse Modification Determination**

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.

The destruction or adverse modification analysis in this biological opinion relies on four components: (1) the Status of Critical Habitat, which describes the rangewide condition of the critical habitat for the Morro shoulderband snail and the tidewater goby; (2) the Environmental Baseline, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) the Effects of the Action, which are all consequences to critical habitat caused by the proposed action that are reasonably certain to occur in the action area; and (4) Cumulative Effects, which evaluate the effects of future non-Federal activities in the action area that are reasonably certain to occur.

For the section 7(a)(2) determination regarding destruction or adverse modification, the Service begins by evaluating the effects of the proposed Federal action and the cumulative effects. The Service then examines those effects against the condition of all critical habitat described in the listing designation to determine if the proposed action's effects are likely to appreciably diminish the value of critical habitat as a whole for the conservation of the species.



## STATUS OF THE SPECIES

### Morro Shoulderband Snail

#### Legal Status

The Service listed the Morro shoulderband snail as endangered on December 15, 1994 (Service 1994). We completed a recovery plan for the species and four plants from western San Luis Obispo County in September 1998 (Service 1998). We designated critical habitat on February 7, 2001 (Service 2001) and completed a 5-year status review for the species in 2006 (Service 2006). In 2019, we completed a species status assessment (SSA) report the recommended downlisting the Morro shoulderband snail from endangered to threatened status (Service 2019). We published the reclassification of Morro shoulderband snail from endangered to threatened with section 4(d) rule on February 3, 2022 (Service 2022).

#### Natural History

The Morro shoulderband snail is a member of the terrestrial snail family Helminthoglyptidae. Its genus, *Helminthoglypta*, is a complex of many species of shoulderband snail, each with a relatively small range (Burke et al. 1999). The Big Sur shoulderband snail (*H. umbilicata*) occurs sympatrically (occupies the same geographic area but does not interbreed) with the Morro shoulderband snail (Walgren 2003). We once considered that that the Chorro shoulderband snail (*H. morroensis*) occupied a distinctly different geographic distribution from the Morro shoulderband snail (Roth and Tupen 2004); however, now have information that Morro and Chorro shoulderband snails occur sympatrically (Tenera Environmental 2006). Walgren (2003) previously documented intermediate forms of these two species.

At the time of listing, the Service believed the species was restricted to sandy soils of coastal dune and dune scrub habitats in the area of Los Osos, Baywood Park, and Morro Bay. Roth (1985) speculated perhaps as few as several hundred Morro shoulderband snails remained throughout the geographic range of the species. A very limited survey for the species conducted in 1992 did not identify any live snails (Service 1994); however, subsequent surveys conducted primarily in association with proposed development projects have consistently identified live individuals indicating the population is more robust than previously thought. Pre-construction surveys conducted as part of the Los Osos Wastewater Project demonstrate that the Morro shoulderband snail occupies a diversity of both native and non-native habitats throughout its geographic range (SWCA 2013, SWCA 2014).

In native habitat underlain by Baywood fine sand soils, the Morro shoulderband snail typically occurs in accumulated organic understory or duff and on the undersides of shrub branches near the soil surface. Plant species commonly associated with the presence of Morro shoulderband snail include mock heather (*Ericameria ericoides*), dune lupine (*Lupinus chamissonis*), seaside woolly sunflower (*Eriophyllum staechadifolium*), deerweed (*Acemispson glaber* [*Lotus scoparius*]), and sand almond (*Prunus fasciculata* var. *punctata*). Morro shoulderband snails also occur in

non-native iceplant species (e.g., *Carpobrotus edulis*, *C. chilensis*) and the nonnative grassland dominated by perennial veldt grass (*Ehrharta calycina*). Past and current observations (Walgren 2003, SWCA 2013, SWCA 2014) indicate that the microclimate necessary for the species' survival and reproduction is defined more by plant species physiognomy and soils than presence of any particular plant species.

Morro shoulderband snails are most active when increased moisture availability facilitates their ability to disperse, find food, and mate. In the dry season, Morro shoulderband snails, like other terrestrial snail species, aestivate in accumulated litter or attached to the branches of shrubs. As with other snails in the genus *Helminthoglypta*, this species aestivates by producing an epiphragm (a seal of dried mucus in the aperture of the shell) to reduce water loss during the dry season. Information on the bronze shoulderband (*Helminthoglypta arrosa*), a similar terrestrial snail species found in coastal scrub in northern California, indicates that smaller individuals are more often found aestivating under vegetation and leaf litter. They also aestivate under vegetation on the ground (van der Laan 1973a) or on the twigs of shrubs. This may also be the case for Morro shoulderband snail as it is found in habitats with a similar plant species composition to that of the bronze shoulderband.

Like most terrestrial snails, the Morro shoulderband snail is an herbivore, feeding predominantly on detritus. Fungi may be a potential food source for Morro shoulderband snails although as with the bronze shoulderband, dead material is strongly preferred over living material for those acceptable plant species (van der Laan 1973b).

### **Rangewide Status**

Based on the recovery plan and our SSA report (Service 1998, Service 2019), we conclude that the status of the Morro shoulderband snail has improved throughout its range due to the substantial amount of habitat that has been preserved that was previously at risk for development, along with land use decisions and management activities undertaken by the County and landowners since the time of listing. The SSA report contains an accounting of conservation and management efforts (Service 2019). Overall, our analysis indicates that the intent of the downlisting criteria for the Morro shoulderband snail has been met (Service 2022); however, delisting criteria have not yet been achieved.

At the time of its listing, threats to the Morro shoulderband snail included habitat loss and degradation, competition from non-native snail species, negative effects of off-highway vehicle activity, and use of pesticides. Since then, several of these threats have been ameliorated; however, habitat loss, and especially habitat degradation due to changes in habitat community structure and composition, continue to constitute a substantial threat to the species. Dehydration is a major threat to all terrestrial mollusks; therefore, another threat to the Morro shoulderband snail is exposure resulting from partial or complete removal of protective, sheltering vegetation that provides a more mesic microclimate. As with other species of *Helminthoglypta*, the Morro shoulderband snail is subject to predation by small mammals and snakes (van der Laan 1980, Huntzinger et al. 2008). Although no formal studies have provided evidence that disturbance

during aestivation may adversely affect Morro shoulderband snails, individuals likely survive careful capture and relocation into nearby suitable habitat (SWCA 2014). Absent any additional studies, we must consider that some individuals could suffer physiological stress or even death if their epiphragm is affected or individuals experience desiccating conditions because of disturbance during aestivation.

## **Recovery**

The Service prepared a recovery plan for Morro shoulderband snail and four plants from western San Luis Obispo County in 1998 (Service 1998). The recovery goal for the Morro shoulderband snail is delisting. Recovery actions for the Morro shoulderband snail focus on securing and protecting suitable occupied habitat in all identified conservation planning area sufficient to support populations of the species in the long-term (i.e., at least 50 years). There are four Conservation Planning Areas defined: Area 1: Morro Spit, Area 2: West Pecho, Area 3: South Los Osos, Area 4: Northeast Los Osos. The recovery plan specifies that Morro shoulderband snail populations and their habitats are secured in all four Conservation Areas with populations large enough to minimize the short-term chance of extinction, as shown by life history studies. There must be adequate progress on control of exotic pest plants (including veldt grass) to assure that occupied habitat can remain intact and usable to the snail. Progress must have been made toward assessing possible threats, including competition from, or predation by non-native snails and use of pesticides. It is important to continue efforts to survey for Morro shoulderband snail in potential habitat within the snail's historic range to ascertain whether undiscovered populations exist; if so, delisting criteria will have to be reviewed. Delisting criteria for the Morro shoulderband snail are the following: sufficient populations and suitable habitats (as shown by life history studies) from each of the four Conservation Planning Areas (and, if necessary, any newly located populations) must be secured from the known threats, including exotic pest plants. Possible threats, including competition from non-native snails, predation by non-native snails, and use of pesticides, must have been assessed and effectively controlled or removed. The sites must be under permanent management to maintain the desired vegetation structure and control pests and human incursions.

The SSA report concluded that the intent of the downlisting criteria for the Morro shoulderband snail has been met; however, delisting criteria have not yet been achieved (Service 2019). The Service reclassified the Morro shoulderband snail from endangered to threatened in 2022 (Service 2022).

## **Critical Habitat for Morro Shoulderband Snail**

The Service designated critical habitat for the Morro shoulderband snail on February 7, 2001 (Service 2001). It includes three units covering 2,566 acres in western San Luis Obispo County. The action area is within designated Unit 3.

The phrases “primary constituent elements” (PCEs) and “physical and biological features” (PBFs) are synonymous. Critical habitat rules published before February 11, 2016, used the

term PCE, while critical habitat rules published after that date use the term PBF. In cases where a critical habitat rule numbers PCEs specifically (e.g., PCE-1, PCE 1), we will use the terms as defined in the critical habitat designation to avoid confusion.

The critical habitat designation for Morro shoulderband snail does not contain a numerical list of what are termed in the document as “primary constituent elements”, but instead, describes designated units as providing the following physical and biological features: sand or sandy soils needed for reproduction; a slope not greater than 10 percent to facilitate movement of individuals; and the presence of native coastal dune scrub vegetation. This vegetation is typically, but not exclusively, represented by mock heather, buckwheat (*Eriogonum* spp.), eriastrum, chamisso lupine, dudleya (*Dudleya* spp.), and in more inland locations, California sagebrush (*Artemisia californica*), coyote brush (*Baccharis pilularis*), and black sage (*Salvia mellifera*). Critical habitat was delineated in the Los Osos area in three units: Unit 1: Morro Spit and West Pecho; Unit 2: South Los Osos; and Unit 3: Northeast Los Osos. Some of the habitat in the critical habitat units could be improved through habitat rehabilitation or improved management (e.g., removal of nonnative species).

## **Tidewater Goby**

### **Legal Status**

The Service listed the tidewater goby as endangered on March 7, 1994 (59 FR 5494) and designated critical habitat for the tidewater goby on February 6, 2013 (78 FR 8745). We published a recovery plan for the tidewater goby on December 12, 2005 (Service 2005) and a 5-year review in September 2007 (Service 2007). The Service published a proposed rule to downlist the tidewater goby on March 13, 2014 (79 FR 14339). During the public comment period, the Service received substantial comments regarding the proposed change in species status, and the tidewater goby remains listed as endangered.

### **Natural History**

The tidewater goby is endemic to California and is one of the only species of fish to live exclusively in brackish water coastal lagoons, estuaries, and marshes in California (Swift et al. 1989, Moyle 2002). Tidewater goby habitat is characterized by fairly still, but not stagnant, brackish water. They can withstand a wide range of habitat conditions and have been documented in waters with salinity levels that range from 0 to 42 parts per thousand (ppt), temperatures ranging from 46 to 77 degrees Fahrenheit and water depths from 10 to 79 inches (Irwin and Soltz 1984, Swift et al. 1989, Smith 1998). Most tidewater goby collections occurred in water of approximately one-third ocean salinity; (i.e., 12 ppt or less; Service 2005). Tidewater gobies are generally found over substrate that has a high percentage of sand and gravel (Worcester 1992) and are often clumped in areas that have sparse to medium dense cover by aquatic plants or algae (Worcester 1992). Tidewater gobies often migrate upstream and are commonly found up to 0.6 mile up from a lagoon or estuary (Service 2005), and have been recorded as far as 3 to 5 miles upstream of tidal areas (Irwin and Soltz 1985).

Tidewater gobies feed on small invertebrates, including amphipods, ostracods, snails, mysids, and aquatic insect larvae, particularly chironomid larvae (Swift et al. 1989). Predators of tidewater gobies include staghorn sculpin (*Leptocottus armatus*), prickly sculpin (*Cottus asper*), starry flounder (*Platichthys stellatus*), and largemouth bass (*Micropterus salmoides*); native birds and other predatory fish likely also prey on gobies (Swift et al. 1997, Swift et al. 1989).

The tidewater goby is primarily an annual species (Swift et al. 1989), although there is some variation in life history and some individuals have lived up to 3 years in captivity (Swenson 1999). If reproductive output during a single season fails, few (if any) tidewater gobies survive into the next year. Reproduction typically peaks from late April or May to July and can continue into November or December depending on the seasonal temperature and amount of rainfall (Swift et al. 1989, Worcester 1992, Goldberg 1977). Males begin the breeding ritual by digging burrows at least 3 to 4 inches apart in clean, coarse sand of open areas. Unlike most other fish, females court the males (Swift et al. 1989). Once chosen by a male, females will then deposit eggs into the burrows, averaging 400 eggs per spawning effort (Swift et al. 1989, Swenson 1995). Males remain in the burrows to guard the eggs and fan the eggs to circulate water, frequently foregoing feeding (Moyle 2002).

Within 9 to 11 days after eggs are laid, larvae emerge and are approximately 0.16 to 0.24 inch (Swift et al. 1989, Service 2005). Larval traits (larval duration, size at settlement, and growth rate) are correlated with water temperature, which varies considerably in the seasonally closed estuaries that tidewater gobies inhabit (Spies and Steele 2016). Larval tidewater gobies are pelagic for an average of 21 to 27 days and settle once they grow to approximately 0.47 to 0.51 inch in standard length (Spies et al. 2014). When they reach this life stage, they become substrate-oriented, spending the majority of time on the bottom rather than in the water column. Both males and females can breed more than once in a season, with a lifetime reproductive potential of 3 to 12 spawning events (Swenson 1999). Vegetation is critical for over-wintering tidewater gobies because it provides refuge from high water flows and tidewater goby densities are greatest among emergent and submerged vegetation (Moyle 2002).

Because they typically live for approximately one year and inhabit a seasonally changing environment, population sizes of tidewater gobies vary greatly spatially and seasonally, with recorded numbers ranging from 0 to 18.39 individuals per square foot (Swenson 1995). After the spring spawning season, there is typically an annual die-off of adults (Swift et al. 1989; Swenson 1995).

### **Rangewide Status**

Historically, the tidewater goby occurred in at least 150 California coastal lagoons and estuaries, from Tillas Slough near the Oregon/California border south to Agua Hedionda Lagoon in northern San Diego County (Swift et al. 1989); the southern extent of its distribution has been reduced by several miles after the mouth of Agua Hedionda Lagoon was permanently modified to be open to the ocean and no longer supports tidewater gobies. The species is currently known to occur in 103 localities, although the number of sites fluctuates with climatic conditions and



the current status is unknown in 12 localities. Currently, the most stable populations are in lagoons and estuaries of intermediate size (5 to 124 acres) that are relatively unaffected by human activities (Service 2005).

Local populations of tidewater gobies are best characterized as metapopulations (Lafferty et al. 1999a), or “a network of semi-isolated populations with some level of regular or intermittent migration and gene flow among them, in which individual populations may go extinct but can then be recolonized from other populations” (Groom et al. 2006). Therefore, the stability of a metapopulation depends on the connectivity of subpopulations.

Tidewater gobies enter the marine environment when sandbars are breached during storm events. Lafferty et al. demonstrated that tidewater gobies were able to disperse at least 5.6 miles (Lafferty et al. 1999b), and genetic analysis suggests that this species can disperse much further, with genetic assignment tests showing movement of individuals up to approximately 30 miles (Jacobs et al. 2005). The species’ tolerance of high salinities for short periods of time enables it to withstand marine environment conditions of approximately 35 ppt salinity, thereby allowing the species to re-establish or colonize lagoons and estuaries following flood events (Swift et al. 1997). Genetic studies indicate that the tidewater goby population is highly geographically structured, indicating that there is low geneflow (Dawson et al. 2001; Dawson et al. 2002) and thus natural recolonization events are likely rare. Swift et al. (2016) estimates that the southernmost population of tidewater goby has been separated from other lineages for 2 to 4 million years, and it has been recognized as a distinct species (*Eucyclogobius kristinae*, the southern tidewater goby), but as of now the tidewater goby remains listed under the Endangered Species Act as one entity.

Native predators are not known to be important regulators of tidewater goby population size in the lagoons of southern California. Rather, population declines are attributed to environmental conditions. The decline of the tidewater goby is attributed primarily to habitat loss or degradation resulting from urban, agricultural, and industrial development in and around coastal wetlands, lagoons, and estuaries (Irwin and Soltz 1985). High flows naturally and periodically breach lagoon barriers and expose tidewater gobies to tidal conditions, but artificial breaching has been observed to cause tidewater goby stranding and mortality (Swift et al. 2018). Artificial breaching, especially during periods of low inflow, not only flushes tidewater gobies out into the ocean but also drains water from the lagoon and thus reduces the size of available habitat for this species; this can also concentrate predators within this reduced lagoon footprint. Some extirpations appear to be related to pollution, upstream water diversions, and the introduction of non-native predatory fish species, most notably centrarchid sunfish (*Lepomis* spp.) and bass (*Micropterus* spp.) (Swift et al. 1989). These threats continue to affect some of the remaining populations of tidewater gobies. Climate change and the attendant sea level rise may further reduce suitable habitat for the tidewater goby as lagoons and estuaries are inundated with saltwater (Cayan et al. 2006) and severe storms interacting with increased sea levels may breach lagoons more frequently.

In 2014, the Service issued a 12-month finding proposing to reclassify the tidewater goby as threatened under the Act. During the public comment period, we received substantive comments regarding the proposed change in the species' status and new scientific information has been published regarding the species. The tidewater goby remains listed as endangered and its overall population and range is currently stable, but still faces ongoing and likely increasing threats of urbanization, artificial breaching, stochastic environmental conditions, and introduced predators. The southernmost population of tidewater goby remains critically endangered because this species has become extirpated from 5 of the 13 historical localities, 4 of which cannot be restored.

## **Recovery**

The goal of the tidewater goby recovery plan (Service 2005) is to conserve and recover the tidewater goby throughout its range by managing threats and maintaining viable metapopulations within each recovery unit while retaining morphological and genetic adaptations to regional and local environmental conditions. The decline of the tidewater goby is attributed primarily to habitat loss or degradation resulting from urban, agricultural, and industrial development in and around coastal wetlands. The recovery plan identifies six recovery units: North Coast Unit, Greater Bay Unit, Central Coast Unit, Conception Unit, Los Angeles/Ventura Unit, and South Coast Unit.

The recovery plan specifies that the tidewater goby may be considered for downlisting when:

1. Specific threats to each metapopulation (e.g., coastal development, upstream diversion, channelization of rivers and streams) have been addressed through the development and implementation of individual management plans that cumulatively cover the full range of the species; and
2. A metapopulation viability analysis based on scientifically-credible monitoring over a 10-year period indicates that each recovery unit is viable. The target for downlisting is for individual sub-units within each recovery unit to have a 75 percent or better chance of persistence for a minimum of 100 years.

The tidewater goby may be considered for delisting when the downlisting criteria have been met and a metapopulation viability analysis projects that all recovery units are viable and have a 95 percent probability of persistence for 100 years.

## **Tidewater Goby Critical Habitat**

We originally designated critical habitat for the tidewater goby on November 20, 2000 (65 FR 69693). In January 2008, we finalized a revised designation of critical habitat (73 FR 5920). On October 19, 2011, we published another proposed revision to critical habitat (76 FR 64996), and on February 6, 2013, we published a final rule designating revised critical habitat for the tidewater goby (78 FR 8745).

Under the Act and its implementing regulations, we are required to identify the physical and biological features (PBFs) essential to the conservation of the tidewater goby in areas occupied at the time of listing. We consider the PBFs that, when present in the appropriate quantity and spatial arrangement to provide for a species' life-history processes, are essential to the conservation of the species. The PBFs specific to the tidewater goby include:

PBF 1: Persistent, shallow (in the range of approximately 0.3 to 6.6 feet), still-to-slow-moving water in lagoons, estuaries, and coastal streams with salinity up to 12 ppt, which provide adequate space for normal behavior and individual and population growth that contain one or more of the following:

- PBF 1a: Substrates (e.g., sand, silt, mud) suitable for the construction of burrows for reproduction;
- PBF 1b: Submerged and emergent aquatic vegetation, such as *Potamogeton pectinatus*, *Ruppia maritima*, *Typha latifolia*, and *Scirpus* spp., that provides protection from predators and high flow events; or
- PBF 1c: Presence of a sandbar(s) across the mouth of a lagoon or estuary during the late spring, summer, and fall that closes or partially closes the lagoon or estuary, thereby providing relatively stable water levels and salinity.

Critical habitat includes areas outside the geographical area occupied at the time of listing that contain suitable aquatic habitat in coastal lagoons or estuaries, provide connectivity between source populations or may provide connectivity in the future, or may be more isolated but represent unique adaptations to local features (habitat variability, hydrology, microclimate). In total, we designated 45 critical habitat units within the geographical area occupied at listing and 20 critical habitat units outside the geographical area occupied at listing that we have determined are essential for the conservation of the species.

Approximately 12,156 acres fall within the boundaries of the 65 critical habitat units designated by the 2013 final revised critical habitat rule. Revised critical habitat for the tidewater goby now occurs in Del Norte, Humboldt, Mendocino, Sonoma, Marin, San Mateo, Santa Cruz, Monterey, San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, and San Diego Counties, California. Overall, the critical habitat for this species has remained stable but is still threatened by coastal development.

## **Morro Manzanita**

### **Legal Status**

The Service listed the Morro manzanita as threatened in 1994 (59 FR 64613). The Morro manzanita was included in the Recovery Plan for Morro Shoulderband Snail and Four Plants

from Western San Luis Obispo County published on September 28, 1998 (Service 1998). The Service completed a 5-year review for Morro manzanita on December 12, 2013 (59 FR 64613).

### Natural History

Morro manzanita is a long-lived shrub in the heath family (Ericaceae), with mature individuals reaching 12 feet in height. Morro manzanita produces white to pink downward-facing, urn-shaped flowers starting in December. Orange-red fruits mature in summer and contain 8 to 10 seeds each; seed dispersal occurs in the fall.

Although we do not know whether the flowers are self-compatible, extensive research revealed that pollination is required for reproduction. In 1998 and 1999, Tyler and Odion found that bumblebees (*Bombus vosnesenskii*) are the dominant pollinators, though anthophorid bees (*Anthophora urbana*), several bee flies (*Bombylius* spp.), and syrphid flies (family Syrphidae) are also known pollinators. The authors also noted surprisingly low pollinator activity for both years surveyed (Tyler et al. 1998 and 2000). Only 10 percent of flowers examined in 1998 produced fruits. Pollinator abundance and abiotic factors (i.e., climate) may play a role in annual and seasonal variation (Tyler et al. 1998).

Birds and large mammals (coyote (*Canis latrans*) and mule deer (*Odocoileus hemionus*)) are thought to aid Morro manzanita in seed dispersal (Keeley and Hays 1976). This secondary dispersal (which occurs after the parent plant initially sets seed) is limited, however, as evidenced by 90 percent fewer seeds present in soil cores 5 feet (1.5 meters) away from Morro manzanita compared to samples taken from beneath the canopy (Tyler and Odion 1996).

There is a clear difference in a basic life history trait that separates the genus *Arctostaphylos* into two functional groups. One group resprouts from a woody burl following canopy removal by fire or mechanical action. The other group has lost this ability to resprout and, as such, reproduce only by seed. Lacking a woody burl from which it can resprout, Morro manzanita is an obligate-seeding species. Seeds of obligate seeders are long-lived and inhibited from germinating until primary dormancy is released by a specific mechanism. The dormancy mechanism allows the species to build up a seed bank that is persistent (Tyler and Odion 1996).

For Morro manzanita and other obligate-seeding species of manzanita, maintenance and regeneration are dependent upon mass germination triggered by fire (Tyler and Odion 1996). Fire breaks also create open areas where seedlings can germinate and individuals establish. The life history of an obligate seeder can only be successful if the interval between fires is long enough for seeds to accumulate the quantity required to replace the parent generation. The number of seeds in the soil that must accumulate is very high, as seed mortality has been found to be substantial in chaparral burns (Tyler et al. 2000). However, suppressing fire for too long could lead to the development of climax, closed-canopy chaparral stands, eventually having an adverse effect on populations of Morro manzanita by precluding expansion into otherwise suitable habitat and maintenance of even-aged, eventually-senescing stands; this is referred to as “senescence risk” (Ne’eman et al. 1999).

Morro manzanita is found in association with coastal dune scrub, maritime chaparral, and coast live oak woodland communities (Service 1998). In openings between the shrubs, these communities support a diversity of native and nonnative herbaceous species.

Morro manzanita is primarily found on Baywood fine sand soils (ancient wind-blown beach sands), developed on ancient sand dunes deposited during the Pleistocene epoch. The species is found on a variety of slopes and aspects, though cover is concentrated within two slope categories: 9 to 15 percent slopes, and 15 to 30 percent slopes (McGraw 2005, Tyler and Odion 1996). On steep slopes, particularly on the north-facing slopes of the Irish Hills, it can be found in almost pure stands. This narrow habitat preference makes this species particularly vulnerable to habitat loss and fragmentation. Approximately 75 percent of its historical habitat has been converted for residential use, resulting in highly fragmented populations. The limited dispersal abilities of this species further exacerbates the threat of habitat fragmentation.

### **Rangewide Status**

Morro manzanita ranges from the northeast side of Morro Bay to the southern end of Montaña de Oro State Park, a distance of less than 10 miles. The distribution of Morro manzanita is correlated with the distribution of Baywood fine sands. Based on the distribution of these sands, the historical distribution of Morro manzanita is estimated to have comprised between 2,000 and 2,700 acres. In 1994 when the species was listed, it was estimated that the range covered by Morro manzanita was 840-890 acres (Service 1994). In 2013, we estimated that approximately 75 percent of the former range of the species had been converted to urban development, and the existing extent of Morro manzanita has been reduced to less than 400 acres. The species is continuously threatened by habitat conversion and fragmentation.

Because stands of Morro manzanita, and maritime chaparral in general, grow so densely, it is difficult to count numbers of individuals during surveys. As variation in stand density and the growth habits of the species make demographic studies difficult, actual abundance may have been significantly lower than those reported by LSA Inc. (LSA 1992) (McGuire and Morey 1992). Therefore, estimates of abundance have typically been based on the density of cover instead. During their surveys in 1991, LSA (1992) used five cover classes and percent, 50 to 75 percent, 25 to 50 percent, 5 to 25 percent, and 1 to 5 percent. Based on this approach, LSA estimated approximately 153,000 Morro manzanita plants occurred across the species' range at the time of listing. LSA made these estimates based on a helicopter flyover and walkover surveys of Morro manzanita populations within Montaña de Oro State Park and above Cabrillo Estates. LSA assumed that an individual plant covered approximately 100 square feet (9.3 square meters) or 11.3 feet (3.4 meters) in diameter. However, McGuire and Morey produced a lower estimate than LSA (using a 15-foot diameter per individual), estimating that the total species population would be closer to 86,500 individuals (McGuire and Morey 1992).



## **Recovery**

The recovery objective for Morro manzanita is delisting. Morro manzanita can be considered for delisting when all three of the following have been achieved: (1) 90 percent of existing acreage supporting high (75-100 percent) and medium (25-75 percent) cover of Morro manzanita and 85-90 percent of low (1-24 percent) cover supporting Morro manzanita are secured from human-induced threats in preserves in the Northeast Los Osos, South Los Osos and West Pecho Conservation Planning Areas with no greater fragmentation by roads, residences, or other areas of human use than currently exists, (2) evidence that the acreage and approximate cover classes of Morro manzanita in preserves can be maintained over time and that preserves are not made unmanageable by small size, proximity to urban development, or fragmentation, and (3) site-specific management plans have been successfully implemented for the preserves. Because habitat in the Conservation Planning Areas must remain unfragmented to recover this species, habitat attrition must be restricted to isolated or remnant patches of Morro manzanita that are unlikely to be viable over the long term. Highest priority for securing sites should be given to stands where Morro manzanita is the dominant in terms of cover, where large blocks of occupied habitat are still present, and where Morro manzanita habitat can be secured that abuts other protected lands, as in the South Los Osos Conservation Planning Area.

## **ENVIRONMENTAL BASELINE**

The implementing regulations for section 7(a)(2) (50 CFR 402.02) define the environmental baseline as “the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency’s discretion to modify are part of the environmental baseline.”

## **Action Area**

The implementing regulations for section 7(a)(2) of the Act (50 CFR 402.02) define the “action area” as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The action area includes the bridge construction impact area, construction staging areas, potential mitigation areas and a minimum 100-foot-wide buffer. The total size of the action area is approximately 49 acres. The action area is approximately 700 feet wide at the location of the bridge; because of a large creek meander, the action area includes approximately 1,350 linear feet of the Los Osos Creek channel (1,050 feet downstream of the bridge and 300 feet upstream).

### **Habitat Characteristics of the Action Area**

The action area is within Morro Bay State Park and Morro Estuary Natural Preserve, and includes a portion of the estuary at the mouth of Los Osos Creek. The Morro Bay watershed covers approximately 76 square miles and includes two major tributaries: Chorro Creek and Los Osos Creek. The 2,300-acre Morro Bay estuary is one of 28 estuaries in the National Estuary Program (managed by the Morro Bay National Estuary Program), a program designated and funded by the U.S. Environmental Protection Agency to protect estuaries of national significance.

The habitats of the action area consist of Morro manzanita chaparral, coyote brush scrub, Lompoc ceanothus chaparral, eroded dune slope, coast live oak woodland, pickleweed salt marsh, California bulrush marsh, arroyo willow stands, non-native grass and iceplant stands, ruderal disturbed areas, and open water in the Los Osos Creek channel.

### **Existing Conditions in the Action Area**

The action area includes the South Bay Boulevard Bridge and its right-of way. Although this is a developed feature, the action area contains and is adjacent to unique ecosystems endemic to the specific location. Although there are stands of invasive species, such as iceplant and veldt grass, and some small disturbed areas, the majority of vegetated areas are dominated by native habitat types, including local endemic species, in relatively good condition.

### **Previous Consultations in the Action Area**

We are unaware of previous consultations that overlap with the action area.

### **Condition (Status) of the Species in the Action Area**

#### **Morro shoulderband snail**

Within the action area, suitable Baywood fine sand soils occur south of Los Osos Creek. Coyote brush scrub has colonized historic fill northwest of the existing bridge. Although coastal dune scrub vegetation does not occur within the action area, a few areas of open Morro manzanita chaparral, Lompoc ceanothus chaparral, and coyote brush scrub may provide suitable habitat for Morro shoulderband snail. The species may also be associated with nonnative species such as veldt grass and ice plant that occur in the action area.

Protocol-level surveys were not conducted for this project. Several survey efforts have been conducted in the action area and vicinity over the last 15 years. No live Morro shoulderband snails were found during these efforts, but a total of six empty shells have been found. No Morro shoulderband snail surveys were conducted at the Santa Ysabel Avenue staging area for this project. However, there is a Morro shoulderband snail relocation receiver site nearby to receive Morro shoulderband snails relocated from the County sewer project. Therefore, because Morro

shoulderband snails occur nearby and the action area contains suitable habitat and vegetation, we consider Morro shoulderband snails to be present within the action area.

### **Morro shoulderband snail Recovery**

The action area is within Conservation Planning Area 4, Northeast Los Osos, and contains suitable habitat on Baywood fine sand soils. The action area is adjacent to protected lands with known populations of Morro shoulderband snail and is in the County right-of-way, and thus will be managed in a manner similar to a protected land because activities will be analyzed for potential environmental impacts. The habitats within the action area are suitable but are not characterized as the ideal coastal dune scrub. Instead, Morro manzanita chaparral, Lompoc ceonothus chaparral, and coyote brush scrub provide suitable habitat for the species. The habitats are relatively intact, with areas of invasive veldt grass and iceplant on the edges of the action area.

### **Condition of Morro shoulderband snail Critical Habitat in the Action Area**

The action area is within Morro shoulderband snail designated critical habitat Unit 3. The action area contains two of the three primary constituent elements defined in the 2001 designation of critical habitat: sand or sandy soils and a slope not greater than 10 percent. Although there are no areas characterized as coastal dune scrub within the action area, the third PCE, we now know Morro shoulderband snails occupy many different native and non-native vegetation types. Within the action area, Baywood fine sand soils occur south of Los Osos Creek and north of the existing bridge. Although coastal dune scrub vegetation does not occur within the action area, a few areas of open Morro manzanita chaparral, Lompoc ceonothus chaparral, and coyote brush scrub within the action area can be considered to provide all three primary constituent elements.

### **Tidewater Goby**

Tidewater goby was detected within or nearby the action area in 1968-70, 1981, and 2001, but was not detected within the action area during protocol surveys conducted for the project in 2016. The survey was conducted during drought conditions, as reflected in high salinity levels (above 32 ppt) in the survey area, likely due to the lack of freshwater inputs from Los Osos Creek. Since that time, normal inflow of fresh water reestablished in the creek during subsequent rain events, particularly during 2019 and 2020. During these more favorable conditions, the tidewater goby population in Los Osos Creek likely recovered and could utilize additional areas within the creek. This species has been found within Los Osos Creek in previous years, which indicates suitable habitat for tidewater goby is present. Therefore, tidewater goby has the potential to occur within the action area. However, the lack of sandy substrate in Los Osos Creek creates unfavorable breeding conditions.

### **Tidewater Goby Recovery**

The action area for the proposed project is located within Los Osos Creek recovery sub-unit CC 3j. The recovery plan described the habitat of this sub-unit as being 250 acres within the Morro Estuary Natural Preserve. The most recent observation of tidewater gobies was in 2001 (Service 2005), and prior to that, tidewater gobies have not been observed here since 1981. Infrequent tidewater goby observations could be due to the designation of Los Osos Creek as “Water Quality Limited” by the State Water Resources Control Board caused by excessive pollutants and stressors entering the creek from urban and agricultural development within the watershed resulting in low dissolved oxygen, high nutrients, and sedimentation and siltation.

### **Condition of Tidewater Goby Critical Habitat in the Action Area**

Los Osos Creek, upstream of the existing bridge, falls within tidewater goby critical habitat Unit SLO-9. Based on data collected during the protocol surveys for tidewater goby, the water depth within the action area is adequate (less than 6 feet) and the Los Osos Creek channel within the action area provides adequate space for growth and reproduction. Water depths due to the tides range from 0 feet (exposed) to an average of 2 to 3 feet at high tide, or up to 5 feet at spring high tides. The channel width, including the shoreline salt marsh, increases with higher tide stages up to approximately 100-feet wide. The action area provides suitable substrates (soft mud) for burrowing, but no sandy substrates for breeding. Submerged and emergent aquatic vegetation of the types listed was not found within the action area during the field surveys, but emergent aquatic vegetation is present in salt marsh and will be accessible to tidewater goby at higher tide stages for refuge. In regard to salinity, tidewater goby is more commonly associated with lower salinity levels than ocean and estuarine salinities that will occur in the absence of a barrier, about 35 ppt. Elevated salinity levels do occur regularly in the action area (Caltrans 2021). The confluence of Los Osos Creek with Morro Bay is not closed by a sand bar; however, the large water volume of the adjacent Morro Bay may stabilize conditions somewhat compared to a site closer to an ocean inlet. Overall, it is assumed the action area offers the primary constituent elements of critical habitat for tidewater goby at various times.

### **Morro Manzanita**

Morro manzanita is typically associated with Baywood fine sand soils. Morro manzanita occurs throughout the action area, but not exclusively on Baywood fine sands. It also occurs on fill installed when the existing bridge was constructed, and a few individuals occur in substrate with Baywood fine sands outside the historic fill limit to the northwest of the bridge.

Morro manzanita is found on a variety of slopes and aspects in association with coast live oak woodland, and in abundance within Morro manzanita chaparral and Lompoc ceanothus chaparral in the action area. Approximately 46 Morro manzanita shrubs are located within the project impact area.

### **Morro Manzanita Recovery**

The Northeast Los Osos Conservation Planning Area supports the most northern intact population of Morro manzanita. The action area does not meet one of the three recovery objectives for habitat needed for recovery of Morro manzanita. The small linear shape of the action area is not ideal to support the need for broad swaths of protected habitat dominated by Morro manzanita. Because the action area is adjacent to larger parcels of protected lands, improvements and maintenance of Morro manzanita habitat in the action area can benefit Morro manzanita recovery.

## EFFECTS OF THE ACTION

The implementing regulations for section 7(a)(2) define effects of the action as “all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action” (50 CFR 402.02).

In conducting this analysis, we have considered factors such as 5-year reviews, published scientific studies and literature, and professional expertise of Service personnel in determining whether effects are reasonably certain to occur. We have also determined that certain consequences are not caused by the proposed action, such as the increase or spread of disease, poaching, or collecting, because they are so remote in time, or geographically remote, or separated by a lengthy causal chain, so as to make those consequence not reasonably certain to occur.

### **Effects of the Proposed Action**

#### **Effects of the Proposed Action on the Morro shoulderband snail**

##### Construction of New Bridge

Pre-activity surveys for Morro shoulderband snail will be conducted prior to ground-disturbing activities and during wet weather work or foggy work days that provide conditions for snail movement. If the Service-approved biologist locates a live Morro shoulderband snail in the action area, it will be captured and relocated to a pre-determined receiver site. The Morro shoulderband snail could be injured or killed during capture and relocation. The individual Morro shoulderband snail may not survive the relocation process. The County proposes to obtain a Service-approved biologist to perform these activities, who will have the experience needed to minimize impacts to Morro shoulderband snail from capture and relocation.

Construction activities could result in direct impacts to Morro shoulderband snails during clearing and grubbing and construction activities in upland portions of the action area. Construction disturbance could affect all life stages of Morro shoulderband snails, if present in



upland areas in the action area. Suitable Morro shoulderband snail habitats, including Morro manzanita chaparral, Lompoc ceanothus chaparral, and coyote brush scrub, will be directly and indirectly be impacted by project activities. Permanent impacts to habitats will result from realigning the north approach road (0.24 acre of Morro manzanita chaparral), and potentially from stormwater runoff from the realigned road to adjacent intact habitats. Temporary impacts to habitats will occur in construction access and staging areas (0.6 acre of Morro manzanita chaparral, 0.08 acre of Lompoc ceanothus chaparral, and 1.37 acres of coyote brush scrub), and there is a potential for additional impacts from construction-related disturbance outside the construction area within the action area during the 30-month construction period.

The County proposes to further refine the direct impact areas to minimize habitat disturbance. Project areas will be confined within high visibility fencing which will minimize additional impacts to habitats. The County also proposes to implement erosion control measures which will minimize impacts to habitats from stormwater runoff.

#### Demolition of Old Bridge

Pre-activity surveys for Morro shoulderband snail will be conducted prior to bridge demolition activities that may occur during wet weather or foggy work days that provide conditions for snail movement. If the Service-approved biologist locates a live Morro shoulderband snail in the action area, it will be captured and relocated to a pre-determined receiver site. The Morro shoulderband snail could be injured or killed during capture and relocation. The County proposes to obtain a Service-approved biologist to perform these activities, who will have the experience needed to minimize impacts to Morro shoulderband snail from capture and relocation.

If Morro shoulderband snails are present during bridge demolition activities, they could be injured or killed by equipment or personnel. Morro shoulderband snail habitat could be impacted by stormwater runoff from work areas or fuel or oil leaks from equipment into adjacent intact Morro shoulderband snail habitat. The County proposes to implement pre-activity surveys during conditions suitable for Morro shoulderband snail movement, as well as erosion control measures and spill prevention measures that will reduce the likelihood of these impacts to Morro shoulderband snail habitat and individuals.

#### Habitat Restoration, Mitigation and Monitoring

Removal of plants for storage and relocation could result in injury or mortality to all life stages of Morro shoulderband snail if present in leaf litter below the plants or in the base or canopy of plants. All life stages of Morro shoulderband snail could be injured or killed during weed control activities, habitat monitoring, and installation of irrigation equipment within restored habitat and mitigation sites. Trash and debris and restoration and mitigation sites could attract predators that could prey upon Morro shoulderband snails. The County proposes to obtain a Service-approved biologist to conduct these activities with the necessary experience to minimize the likelihood of these impacts.

## **Effects of the Proposed Action on Morro Shoulderband Snail Recovery**

### Construction and Demolition

Permanent and temporary impacts to suitable Morro shoulderband snail habitat from construction of the new bridge and demolition of the existing bridge could result in a decrease of suitable habitat available for Morro shoulderband snail recovery within Conservation Planning Area 4, Northeast Los Osos. The construction and demolition phase is expected to last 30 months, during which time the suitable habitat impacted temporarily and permanently by the project activities will be unavailable to support recovery of Morro shoulderband snail. The County proposes to restore temporary impact areas and mitigate for permanent impacts to Morro shoulderband snail habitats, which, over time, would offset the removal of this habitat during the construction and demolition phase.

### Habitat Restoration, Mitigation and Monitoring

Once habitat restoration and mitigation activities are complete and success criteria has been reached, the restoration of temporary habitat impacts and creation of mitigation sites to offset permanent impacts would result in overall improvement of habitats available for recovery. Restoration and mitigation activities include species monitoring which will improve our knowledge of population dynamics. Weeds will be controlled for 5 years within restoration and mitigation sites resulting in improved habitat conditions within the Northeast Los Osos Conservation Planning Area, and could result in improved opportunities for species recovery.

## **Effects of the Proposed Action on Critical Habitat of the Morro Shoulderband Snail**

Construction of the new bridge will result in 2.29 acres of critical habitat being removed for at least 30 months during construction and demolition phases. Following construction, 2.08 acres will be restored within 5 years. The 0.24 acre of permanent critical habitat loss will be replaced within the action area at a ratio of 3:1, resulting in a net gain of 0.48 acre of critical habitat. With the implementation of the Habitat Mitigation and Monitoring Plan, the condition of the critical habitat will likely improve as a result of maintenance, irrigation, and weed control activities.

Other impacts to critical habitat could result from stormwater runoff from road surfaces into habitat outside the restoration and mitigation areas. The County proposes to implement erosion control measures that will minimize the likelihood of these impacts.

## **Effects of the Proposed Action on the Tidewater Goby**

### Construction of the New Bridge

Due to salinity levels of Los Osos Creek, tidewater gobies are more likely to be upstream of the action area where salinity level is more favorable to tidewater goby, and we expect very few, if

any tidewater gobies to be in the action area. Potential impacts to tidewater goby are injury or death during installation of in-water structures, such as temporary trestle, cofferdams, and falsework for permanent pile construction. However, installation techniques, which include a gradual increase in noise and vibration, will decrease the likelihood of potential injury or death of tidewater gobies because gobies would be able to leave the area of impact before incurring harm.

Cofferdam installation could trap fish that will be stranded when the area is dewatered. However, cofferdams will be installed from shoreline to channel if feasible to encourage tidewater goby in the area to leave. Dewatering of cofferdams will be monitored and any trapped fish will be captured and released in a suitable channel location to avoid stranding of fish. Cofferdams will be designed to exclude anticipated high water levels so that once dewatered, tidewater goby are not expected to be able to get into dewatered areas.

The installation and removal of in-water structures may cause localized increases in turbidity. However, while suitable habitat requirements for tidewater goby have been documented for dissolved oxygen, pH, salinity, temperature, they have not been documented for turbidity (Ambrose and Orme 2000). Similarly, turbidity is not listed as a key habitat parameter for tidewater goby (Stillwater Science 2006). Although adverse effects from turbidity have not been documented, the County proposes to keep increases to turbidity to a minimum. The requirements to reduce or eliminate construction-related turbidity increases specified in the Water Quality Control Plan are expected to prevent significant increases in turbidity. Provided construction activities are managed such that these objectives are met, adverse effects to water quality from increased turbidity are not expected to occur.

Noise and turbidity from trestle installation and cofferdam installation could make conditions in Los Osos Creek even less favorable to foraging. However, the amount of tidewater goby foraging in the area is expected to be very low if at all due to the lack of vegetation and high salinity level in this portion of Los Osos Creek. The bridge is slightly larger than the existing bridge, so ultimately, the shading will be increased by an insignificant increment. The aquatic substrate in the action area is unvegetated, and so shading will not reduce existing vegetation. The shading will not impact tidewater goby individuals and will not cause a significant adverse change in the tidewater goby habitat from pre-project condition.

For most installation activities, including oscillation, rotation, vibration, or screw-in pile installation methods, fish may be driven from the project area by noise or vibration, but this effect is not expected to be significant. However, it is possible that the level of water column noise generated by pile driving could cause physical injury to fish. The project has been designed to minimize pile driving, the primary source of underwater noise and vibration. A very small amount of pile driving may be required to verify pile capacity but will be very limited in duration and intensity. A pile drivability study was performed by the project geotechnical engineer to determine approximately how many pile strikes per pile will be required to verify load capacity of the temporary piles. The study concluded that seven to ten strikes per pile will be sufficient for this purpose. If the contractor load tests three to four piles per day maximum as proposed, it

would total 30 total pile strikes per day. The short and temporary duration of this activity will not cause a significant impact to tidewater goby juveniles and adults who may be upstream of the action area.

Tidewater goby could be impacted by stormwater runoff during the construction and demolition phases by removing the vegetation surrounding Los Osos Creek. However, conservation measures have been proposed that will avoid the impacts from stormwater runoff from terrestrial construction areas. In addition, the design of the new bridge construction includes greatly improved stormwater control structures and design as a result of increased water quality requirements. Therefore, it is expected that the new bridge will result in a reduction of road-based pollutants, debris, and sediment entering Los Osos Creek and an overall improvement of water quality, which would likely result in a benefit to tidewater gobies and their habitat.

#### Demolition of Old Bridge

Demolition of the existing bridge will require installation of in-water structures such as temporary demolition trestle and cofferdams. Impacts to tidewater goby from bridge demolition are the same as discussed for bridge construction.

Removal of the existing bridge will restore full sunlight to that portion of the channel, which is expected to result in improved marsh productivity and benthic community structure (invertebrate density and diversity). Recovery of the benthic community and increased salt marsh productivity should occur relatively quickly following bridge demolition.

For permanent impacts, the project will have an incremental beneficial effect by restoring 32 square feet of soft-bottom habitat from removal of the existing bridge supports. No new in-water structures are proposed, so there will be no direct adverse effects from structures on tidewater goby.

#### Habitat Restoration, Mitigation and Monitoring

Habitat restoration could impact tidewater goby or habitat if stormwater or irrigation runoff is allowed to enter Los Osos Creek. Decreased water quality could reduce the ability of the water to support tidewater goby by increasing nutrients or decreasing oxygen. However, the proposed conservation measures will reduce the likelihood of these impacts.

#### **Effects of the Proposed Action on Tidewater Goby Recovery**

As discussed in the effects to the species section, we expect that the proposed action could result in some mortality of tidewater gobies. We expect that tidewater goby populations in the vicinity of the action area would persist despite these effects. As discussed in the status of the species section, tidewater goby populations naturally fluctuate widely within and between years, and we expect that the tidewater goby within and upstream of the action area would be able to rebound from any losses caused by the proposed project. We do not expect the proposed action to affect

genetic diversity between recovery subunits or our ability to address the habitat and predation-related threats identified in the recovery plan (Service 2005).

The design of the new bridge construction includes greatly improved stormwater control. Therefore, by decreasing transport of road-based pollutants, debris, and sediment into Los Osos Creek, it is expected that the new bridge will result in increasing the quality of habitat for tidewater goby, if present.

### **Effects of the Proposed Action on Tidewater Goby Critical Habitat**

The action area contains two elements of PCE 1 of tidewater goby critical habitat unit SLO-9: slow moving shallow water in coastal streams and soft substrate for burrowing, but not breeding. The proposed project will temporarily impact these two elements of PCE 1 from dewatering, temporary pile installation and removal. These activities will temporarily remove the slow moving water and burrowing substrate. Project impacts to tidewater goby critical habitat, include temporary construction impacts to 0.49 acre below the high tide line, which includes 0.38 acre of unvegetated channel and 0.11 acre of pickleweed salt marsh. Approximately half of these impacts will occur during each of two dry season construction periods. Impacts will occur within approximately 200 linear feet of the Los Osos Creek channel. Temporary trestles will extend across 30 linear feet of channel length, and shoreline dewatering areas between 40 and 50 linear feet.

No permanent adverse impacts to tidewater goby critical habitat are proposed. Removal of the existing bridge piers will permanently restore approximately 32 square feet (less than 0.001 acre) of critical habitat.

The design of the new bridge construction includes greatly improved stormwater control as a result of increased requirements. Therefore, it is expected that the new bridge will result in a benefit to tidewater goby critical habitat by decreasing transport of road-based pollutants, debris, and sediment to the waterway.

### **Effects of the Proposed Action on Morro Manzanita**

#### Construction of the New Bridge

Project impacts to Morro manzanita habitat include temporary construction impacts to 33 Morro manzanita individuals within 0.60 acre of Morro manzanita chaparral, and permanent impacts to 13 Morro manzanita individuals within 0.24 acre of Morro manzanita chaparral. Morro manzanita individuals could be trampled or crushed by equipment or vehicles. Runoff from work areas and road surfaces could impact Morro manzanita chaparral outside the temporary and permanent impact areas. The County proposes reduce the project footprint as much as possible and to delineate work areas with high visibility fence. The County also proposes to implement robust erosion control measures. These measures will reduce the likelihood of stormwater runoff and construction equipment impacts to Morro manzanita outside the project impact areas.



### Demolition of the Existing Bridge

Runoff from work areas and road surfaces could impact Morro manzanita chaparral outside the temporary and permanent impact areas. If project boundary fencing is disregarded, Morro manzanita individuals could be trampled or crushed by equipment or vehicles.

### Habitat Restoration, Mitigation and Monitoring

Morro manzanita individuals removed from the project site and stored for later use could die if they were removed improperly or not maintained. Morro manzanita planted following construction could die if adequate maintenance is not maintained. Weed control using herbicide could injure or kill Morro manzanita individuals if herbicide contacts the plant or soil within the dripline.

### **Effects of the Proposed Action to Morro Manzanita Recovery**

The creation of the Morro manzanita mitigation site will be a benefit to recovery by increasing the total area occupied by Morro manzanita within its range by 0.48 acre. The restoration and mitigation areas will be managed under the Habitat Mitigation and Monitoring Plan finalized in collaboration with the Service. Further, the County will be developing and documenting improved techniques for removal, storage, and reinstallation of Morro manzanita individuals. More knowledge about Morro manzanita preservation and propagation will be a valuable tool to offset future impacts to Morro manzanita throughout its range and support its recovery.

### **CUMULATIVE EFFECTS**

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. We do not consider future Federal actions that are unrelated to the proposed action in this section because they require separate consultation pursuant to section 7 of the Act. We are unaware of any non-Federal actions that are reasonably certain to occur in the action area that would adversely affect the Morro shoulderband snail, tidewater goby, or Morro manzanita.

### **CONCLUSION**

The regulatory definition of “to jeopardize the continued existence of the species” focuses on assessing the effects of the proposed action on the reproduction, numbers, and distribution, and their effect on the survival and recovery of the species being considered in the biological opinion. For that reason, we have used those aspects of the status of the Morro shoulderband snail, tidewater goby, and Morro manzanita as the basis to assess the overall effect of the proposed action on the species.

## **Summary of Effects to Morro Shoulderband Snail**

### Morro Shoulderband Snail Reproduction

Injury or mortality of individuals would result in a decrease in reproductive capacity in the action area; however, due to the small number of individuals expected to occur in the action area, we do not expect an appreciable reduction for the species. We do not expect that the capture and relocation of individuals will measurably affect the reproductive capacity of these individuals.

### Morro Shoulderband Snail Numbers

Injury or mortality of individuals would reduce the number of Morro shoulderband snails within the action area; however, due to the small numbers of individuals expected on the subject parcel, this loss would not appreciably reduce the numbers of individuals in this geographic area.

### Morro Shoulderband Snail Distribution

The action area represents only a very small portion (less than 0.78 percent) of the estimated 6,250-acre range of the species. As such, the loss of individuals within the action area is not expected to change or reduce the distribution of Morro shoulderband snail.

### Morro Shoulderband Snail Recovery

The action area is within Conservation Planning Area 4, Northeast Los Osos from the recovery plan (Service 1998). The action area is also within critical habitat unit 3, Northeast Los Osos. The proposed project will result in a loss of suitable habitat for 30 months during construction. However, after restoration and mitigation measures are complete, the Conservation Planning Area will receive a net increase of 0.48 acre of suitable habitat managed under a Habitat Mitigation and Monitoring Plan. Thus, the overall impact of the project is not expected to reduce the likelihood of recovery for the Morro shoulderband snail.

After review of the current status of the Morro shoulderband snail, the environmental baseline for species in the action area, the effects of the proposed action, the effects on recovery, and the potential for cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Morro shoulderband snail. We reached this conclusion because:

1. With the implementation of the proposed conservation measures, we expect very few Morro shoulderband snails to be injured or killed during the implementation of the proposed action.

2. The project activities include restoration and mitigation of habitat for the Morro shoulderband snail that includes maintenance activities. The restored and created habitats could be higher quality than what was available within the action area prior to proposed project activities, which may improve Morro shoulderband snail recovery potential.

## **Summary of Effects to Tidewater Goby**

### Tidewater Goby Reproduction

The action area does not contain suitable breeding habitat for tidewater goby, so we do not expect any impacts to tidewater goby reproduction from the proposed activities.

### Tidewater Goby Numbers

There is a small chance that the proposed action could result in mortality of an unknown quantity, but likely small, number of tidewater gobies. Tidewater goby habitat would be temporarily disturbed during project activities, which could cause tidewater gobies to avoid the project area. Dewatering activities could kill or injure tidewater gobies if they are present in the project area. The impacts to tidewater goby habitat will be temporary, and the impacts to tidewater goby individuals will be minor, because few if any tidewater gobies are expected to occur in the project area. Therefore, we do not expect the loss of individuals to have long-term population-level effects that would reduce appreciably the likelihood of both the survival and recovery of the tidewater goby.

### Tidewater Goby Distribution

We expect the proposed action to have no effects to the distribution of the tidewater goby. The proposed action could result in occasional mortality of individuals or removal of valuable habitat features, but we do not expect these effects to be of a magnitude that would result in a reduction in the species' distribution.

### Tidewater Goby Recovery

We expect that the proposed action could result in mortality of tidewater gobies and temporarily disturb habitat within the action area. Because of the proposed conservation measures, we expect the extant Los Osos Creek population within and upstream of the action area to persist despite the loss of individuals from proposed activities, and that effects to habitat would be limited to small areas and occur infrequently. As discussed in the status of the species section, tidewater goby populations naturally fluctuate widely within and between years, and we expect that the populations within the action area would be able to rebound from any mortality of individuals caused by the proposed action. We do not expect the proposed action to affect our ability to address the habitat degradation and predation related threats identified in the recovery plan (Service 2005). Therefore, we do not expect the effects of the proposed action to appreciably reduce the likelihood of recovery of the tidewater goby.

After reviewing the current status of the tidewater goby, the environmental baseline for the action area, the effects of the proposed woody materials management, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the tidewater goby because:

1. The project will impact a small portion of tidewater goby habitat. The stormwater runoff control improvements in the new bridge design will reduce discharge of road-borne contaminants into Los Osos Creek, which would likely result in improved water quality of tidewater goby habitat as compared to pre-project conditions.
2. With the implementation of the proposed conservation measures, we expect very few tidewater gobies to be injured or killed during the implementation of the proposed action.

### **Summary of Effects to Morro Manzanita**

#### Morro Manzanita Reproduction

The proposed project will impact Morro manzanita reproduction by temporarily and permanently removing Morro manzanita from the action area. The restoration and mitigation sites will take some time to reestablish conditions that will support reproduction. An increase in Morro manzanita numbers will be supported by installation of container stock to offset losses. Management and maintenance of restoration and mitigation sites will improve the conditions for reproduction by removing invasive species that may encroach on Morro manzanita and prevent seed germination.

#### Morro Manzanita Numbers

The proposed project will decrease Morro manzanita numbers by 46 individuals for at least 30 months. Ultimately, 33 Morro manzanita individuals that will be stored during that time will be reinstalled in the temporary disturbance areas. Thirteen individual Morro manzanita removed from permanent impact areas will be replaced at a ratio of 3:1, or 39 individuals, for a net increase of 26 Morro manzanita individuals within the action area.

#### Morro Manzanita Distribution

We expect the effects from the proposed action to have a small local effect on the distribution of Morro manzanita due to the relatively small area where Morro manzanita will be impacted by the proposed project. The mitigation area created by removal of Santa Isabel Road will result in an overall increase in Morro manzanita distribution locally. Therefore, we do not anticipate the proposed action to appreciably influence the overall distribution of Morro manzanita within the action area or rangewide.

### Morro manzanita Recovery

The creation of the Morro manzanita mitigation site will be a benefit to recovery by increasing the total area occupied by Morro manzanita within its range. The conversion of Santa Ysabel Road to Morro manzanita chaparral habitat will reduce habitat fragmentation in the Northeast Los Osos Conservation Planning Area. The restoration and mitigation areas will be managed under the HMMP, finalized in collaboration with the Service. Further, the County will be developing and documenting improved techniques for removal, storage, and reinstallation of Morro manzanita individuals, as well as propagation from seed. More knowledge about Morro manzanita preservation and propagation will be a valuable tool to help offset future impacts to Morro manzanita throughout its range and support its recovery.

After reviewing the current status of Morro manzanita, the environmental baseline for the action area, the effects of the proposed South Bay Boulevard Bridge Replacement project and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of Morro manzanita because:

1. The project area is small; and therefore, the level of impact to the Morro manzanita population, as a whole, will be negligible.
2. The County will implement avoidance and minimization measures that will greatly reduce the quantity of Morro manzanita plants impacted and will mitigate for unavoidable impacts, which may result in an overall increase in Morro manzanita plants. The conversion of Santa Ysabel Road to Morro manzanita chaparral habitat for mitigation will reduce habitat fragmentation in the Northeast Los Osos Conservation Planning Area, which will improve the conditions to support recovery.

### **Summary of Effects to Morro Shoulderband Snail Critical Habitat**

We anticipate that the proposed project will result in the removal 2.05 acres of critical habitat for 30 months. However, the habitat restoration and mitigation activities will result in a net gain of 0.48 acre of suitable habitat within the critical habitat unit. Also, impacts to critical habitat from stormwater runoff from work areas or road surfaces will be avoided with the implementation of the proposed conservation measures.

After reviewing the current status of the critical habitat of the Morro shoulderband snail, the environmental baseline of critical habitat for the action area, the effects of the proposed project activities on critical habitat, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to result in the destruction or adverse modification of critical habitat of the Morro shoulderband snail because:



1. The effects on the primary constituent elements would be small; and
2. The effects on the conservation value and function of critical habitat would be minimized.

### **Summary of Effects to Tidewater Goby Critical Habitat**

We expect that the proposed action could result in some temporary reduction in quality of tidewater goby habitat during the construction of the bridge and from temporary increase in shading of the water column. However, we expect these temporary impacts to be minor relative to the pre-project habitat quality and the conservation measures that are proposed. In summary, we expect adverse effects to tidewater goby critical habitat, but we expect them to be very limited in severity and scope.

After reviewing the current status of the critical habitat of the tidewater goby, the environmental baseline of critical habitat for the action area, the effects of the proposed project activities on critical habitat, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to result in the destruction or adverse modification of critical habitat of the tidewater goby because:

1. The effects on the various primary constituent elements would be small; and
2. The effects on the conservation value and function of critical habitat would be minimized.

### **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened wildlife species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species; however, limited protection of listed plants is provided at section 9(a)(2) to the extent that the Act prohibits the removal and reduction to possession of federally listed plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of listed plants on

non-Federal areas in violation of State law or regulation or in the course of a violation of a State criminal trespass law.

#### AMOUNT OR EXTENT OF TAKE

We anticipate that Morro shoulderband snail and tidewater goby could be taken as a result of the proposed action. We expect the incidental take to be in the form of death, injury, or capture if they are present during vegetation removal or project activities. Both Morro shoulderband snails and tidewater gobies could be killed or injured if they are captured for relocation. Furthermore, Morro shoulderband snails and tidewater gobies may be harmed if their reproductive fitness is decreased by having to search for alternative foraging sites or, for Morro shoulderband snail, alternative aestivation sites during the length of the project.

We cannot quantify the precise number of Morro shoulderband snails or tidewater gobies that may be taken as a result of the action that Caltrans and the County has proposed because both Morro shoulderband snails and tidewater gobies are small in size and cryptic in nature. Morro shoulderband snails of all age classes can be very difficult to locate during pre-activity surveys, and could easily be missed and subsequently injured or killed by project equipment or activities. Tidewater gobies could easily migrate into the action area undetected during project activities and be injured or killed by project equipment or workers. The protective measures proposed by Caltrans and the County are likely to prevent mortality or injury of most individuals. In addition, finding a dead or injured Morro shoulderband snail or tidewater goby is unlikely.

Consequently, we are unable to reasonably anticipate the actual number of Morro shoulderband snails or tidewater gobies that would be taken by the proposed action; however, we must provide a level at which formal consultation would have to be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that adverse effects to Morro shoulderband snail and tidewater goby would likely be low given the nature of the proposed activities, and we, therefore, anticipate that take of Morro shoulderband snail and tidewater goby would also be low. We also recognize that for every Morro shoulderband snail or tidewater goby found dead or injured, other individuals may be killed or injured that are not detected, so when we determine an appropriate take level we are anticipating that the actual take would be higher and we set the number below that level.

Therefore, if two Morro shoulderband snails or two tidewater gobies of any age class are found dead or injured at any time throughout the project, Caltrans must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease as the exemption provided pursuant to section 7(o)(2) may lapse and any further take could be a violation of section 9 prohibitions.

#### REASONABLE AND PRUDENT MEASURES

The measures described below are non-discretionary, and must be undertaken by Caltrans or made binding conditions of any grant or permit issued to the County, as appropriate, for the

exemption in section 7(o)(2) to apply. Caltrans has a continuing duty to regulate the activity covered by this incidental take statement. If Caltrans (1) fails to assume and implement the terms and conditions or (2) fails to require the County to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, Caltrans must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the impacts of the incidental take of Morro shoulderband snail and tidewater goby:

1. Biologists must be authorized by the Service before they survey for, capture, or relocate Morro shoulderband snail and tidewater goby in the action area as described in the terms and conditions below.
2. Morro shoulderband snail and tidewater goby relocation receiver sites should be located with habitat characteristics that will provide optimum survivability of translocated individuals.
3. The mitigation and monitoring strategy will be finalized in collaboration with the Service.

## TERM AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, Caltrans must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline reporting and monitoring requirements. These terms and conditions are nondiscretionary.

1. The following term and condition implement reasonable and prudent measure 1:
  - a Caltrans must request our approval of any biologist that conduct project activities (i.e., survey) associated with the Morro shoulderband snail and tidewater goby, pursuant to this biological opinion in the action area. Such requests must be in writing, and be received by the Ventura Fish and Wildlife Office at least 30 days prior to any such activities being conducted. Information included in a request for authorization should include: (1) relevant education; (2) relevant training on species identification, survey techniques; (3) a summary of field experience conducting requested activities (to include project/research information); (4) a summary of biological opinions under which they were authorized to work with the listed species and at what level (such as construction monitoring versus surveying), this should also include the names and qualifications of persons under which the work was supervised as well as the amount of work experience on the actual project; (5) any

Federal recovery permits [10(a)1(A)] authorizing the individual to work with the species (to include permit number, authorized activities, and name of permit holder); and (6) any relevant professional references with contact information.

2. The following term and condition implement reasonable and prudent measure 2:
  - a. Caltrans and the County will provide the Service the location of relocation receiver sites for Morro shoulderband snail and tidewater goby for approval. Receiver site information will include microhabitat, physiognomy, and GIS shapefiles and metadata.
3. The following terms and conditions implement reasonable and prudent measure 3:
  - a. Caltrans and the County will collaborate with the Service to finalize the Habitat Mitigation and Monitoring Plan within 120 days from the construction start date.
  - b. The applicant must allow Service access to the action area to observe how the project is being implemented, particularly with regard to measures to minimize take, adherence to the project description and these terms and conditions.

## REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), Caltrans must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement. Caltrans must submit annual monitoring reports that are created by the County as described in the biological assessment (Caltrans 2021) for 5 years after initial mitigation activities take place. Caltrans must submit a report to the Service following initial pre-activity surveys and vegetation removal. The initial activity report should be sent to [fw8venturasection7@fws.gov](mailto:fw8venturasection7@fws.gov). The initial activity report should include:

1. The Service-approved Morro shoulderband snail receiver site location.
2. The number of Morro shoulderband snails observed, relocated, and GIS shapefiles of receiver site with microhabitat characteristics including physiognomy, soil moisture, litter type, litter moisture, number of Morro shoulderband snail individuals incidentally observed.

Furthermore, Caltrans must submit a final construction report to the Service's Ventura Fish and Wildlife Office via electronic mail within 90 days following completion of the proposed project. The final construction report should be sent to [fw8venturasection7@fws.gov](mailto:fw8venturasection7@fws.gov) and must describe all activities that were conducted under this biological opinion, including activities and conservation measures that were described in the proposed action and required under the terms and conditions, and discuss any problems that were encountered in implementing conservation

measures or terms and conditions and any other pertinent information. The final construction report must also include the following information:

1. The type of activities that occurred in the action area (e.g., construction activities, monitoring, surveying).
2. The location of these activities, including shapefiles and metadata.
3. Description of the habitat in which these activities occurred.
4. The Morro shoulderband snail and tidewater goby observed in the action area.
5. The results of any surveys conducted for Morro shoulderband snail and tidewater goby.
6. The number of Morro shoulderband snail, tidewater goby, and Morro manzanita killed or injured during project activities, if any, the dates and times of mortality or injury, the veterinarian or repository that specimens were sent to.
7. The locations of mitigation sites.
8. Morro shoulderband snail and tidewater goby relocation locations and conditions, including GPS coordinates and shapefiles.
9. Summary of invasive species removal, both plant and animal.
10. An analysis of the effectiveness of the avoidance and minimization measures and recommendations for future measures.
11. Any other pertinent information.

#### DISPOSITION OF DEAD OR INJURED SPECIMENS

As part of this incidental take statement and pursuant to 50 CFR 402.14(i)(1)(v), upon locating dead or injured species discussed in this document, initial notification within 3 working days of its finding must be made by telephone and in writing to the Ventura Fish and Wildlife Office (805-644-1766). The report must include the date, time, location of the carcass, a photograph, cause of death or injury, if known, and any other pertinent information.

Caltrans must take care in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. Caltrans must transport injured animals to a qualified veterinarian. Should any treated animals survive, Caltrans must contact the Service regarding the final disposition of the animal(s). The remains of any animals must be placed with educational or research institutions holding the appropriate State and Federal permits, such as the Santa Barbara Natural History Museum (Contact: Paul



Collins, Santa Barbara Natural History Museum, Vertebrate Zoology Department, 2559 Puesta Del Sol, Santa Barbara, California 93460, (805) 682-4711, extension 321), or any other place designated in writing by the Service.

### CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that Caltrans and/or the County develop and publish methodologies for Morro manzanita removal, storage and transplantation, and seed propagation.
2. We recommend that the Service-approved biologist(s) relocate any other native reptiles or amphibians found within work areas to suitable habitat outside of project areas if such actions are in compliance with State laws.
3. We encourage Caltrans, the County, and/or other researchers to participate in and support research on Morro shoulderband snail. Research topics could include, but are not limited to: survey techniques for non-protocol conditions, relocation survivorship, micro-habitat conditions for aestivation, preferred habitat physiognomy, dispersal and migration studies, and the effects of predation or competition on Morro shoulderband snail. We encourage Caltrans to coordinate with the Service and the California Department of Fish and Wildlife to develop research proposals under the Service's Endangered Species Conservation Grants (Section 6 Traditional) Program.
4. We encourage Caltrans and the County to conduct protocol surveys for Morro shoulderband snail within restoration and mitigation sites to support recovery by increasing our knowledge of Morro shoulderband snail populations in the Northeast Los Osos Conservation Planning Area.
5. We encourage Caltrans and the County to implement recovery goals for tidewater goby recovery sub-unit CC 3j by implementing a regular water quality monitoring program, conducting regular surveys for tidewater goby, working with urban and agricultural use planning to reduce water quality impacts, and increasing public awareness of the species and its unique habitat requirement and dependence on water quality.
6. Oak tree replacement is generally conducted at a 10:1 to 20:1 ratio due to the extended length of time it takes for them to grow back to the same stature. Therefore, we recommend that Caltrans and the County adopt this level of replacement for oak trees to be consistent with other mitigation efforts. Manzanitas are also very slow growing and

take many years to recover to their previous stature and we recommend a similar replacement ratio for them as well.

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats.

#### REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) may have lapsed and any further take could be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions about this biological opinion, please contact Debora Kirkland of our staff by electronic mail at [debora\\_kirkland@fws.gov](mailto:debora_kirkland@fws.gov).

Sincerely,

**JENNY MAREK**

Digitally signed by JENNY  
MAREK  
Date: 2022.04.25 18:46:20 -07'00'

Acting for Stephen P. Henry  
Field Supervisor

## LITERATURE CITED

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**California Coastal Commission**

**COASTAL DEVELOPMENT PERMIT**

**CDP 3-22-0826**

**South Bay Boulevard Bridge Replacement**

**Permittee: San Luis Obispo County Public Works Department**

**Issue Date: July 17, 2023**

**Page 1 of 3**

Coastal development permit (CDP) number 3-22-0826 was approved by the California Coastal Commission on July 12, 2023. CDP 3-22-0826 allows for the replacement of the existing 189-foot-long, 37-foot-wide, three-span South Bay Boulevard Bridge with a new 300-foot-long, 50-foot-wide, two-span concrete bridge located immediately east of the existing bridge; on-site bicycle and pedestrian enhancements; off-site public trail connections; habitat restoration, and related improvements. CDP 3-22-0826 is subject to certain terms and conditions, including the standard and special conditions beginning on page 2 of this CDP.

By my signature below, the CDP is issued on behalf of the California Coastal Commission:

DocuSigned by:

*Kevin Kahn*

DEF0E587F71C402

Kevin Kahn, Central Coast District Manager, for Kate Huckelbridge, Executive Director

**Acknowledgement**

The undersigned Permittees acknowledge receipt of this CDP and agree to abide by all terms and conditions thereof. The undersigned Permittees acknowledge that Government Code Section 818.4 (that states in pertinent part that "a public entity is not liable for injury caused by the issuance of any permit") applies to the issuance of this CDP.

*[Signature]*  
San Luis Obispo County Public Works Dept.

*7/17/23*  
Date



# COASTAL DEVELOPMENT PERMIT

**CDP 3-22-0826**

## **South Bay Boulevard Bridge Replacement**

**Page 2 of 3**

### **Standard Conditions**

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- 1. Notice of Receipt and Acknowledgment.** The permit is not valid and development shall not commence until a copy of the permit, signed by the Permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.
- 2. Expiration.** If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.
- 3. Interpretation.** Any questions of intent or interpretation of any condition will be resolved by the Executive Director or the Commission.
- 4. Assignment.** The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.
- 5. Terms and Conditions Run with the Land.** These terms and conditions shall be perpetual, and it is the intention of the Commission and the Permittee to bind all future owners and possessors of the subject property to the terms and conditions.

### **Special Conditions**

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This permit is granted subject to the following special conditions:

- 1. Final Plans. PRIOR TO COMMENCEMENT OF CONSTRUCTION,** the Permittee shall submit two full-size sets of Revised Final Plans to the Executive Director for review and written approval. The Revised Final Plans shall be prepared by a licensed professional or professionals (i.e., architect, surveyor, geotechnical engineer, etc.), shall be based on current professionally surveyed and certified topographic elevations for the entire site, and shall include a graphic scale. The Revised Final Plans shall be in substantial conformance with the proposed 65% design plans (titled "South Bay Bridge Replacement") and dated received in the Coastal Commission's Central Coast District office on September 14, 2022, and shall show all on- and off-bridge project components, including CCT trail connections.
- 2. As-Built Plans. WITHIN THREE MONTHS OF COMPLETION OF CONSTRUCTION,** the Permittee shall submit two copies of As-Built Plans for Executive Director review and approval showing all development authorized by this coastal development permit; all property lines; and all project elements. The As-Built Plans shall be substantially consistent with the approved Final Plans per Special Condition 1. The As-Built Plans shall include color photographs (in hard copy and jpg format) that clearly show the as-built project, and that are accompanied by a site plan that notes the location of each photographic viewpoint and the date and time of each photograph. At a minimum, the photographs shall provide



# COASTAL DEVELOPMENT PERMIT

**CDP 3-22-0826**

## **South Bay Boulevard Bridge Replacement**

**Page 3 of 3**

complete photographic coverage of the permitted bridge and related structures and project elements at this location (e.g., the new bike lane, sidewalks, off-site CCT trails, and associated development).

- 3. Final Mitigation and Monitoring Report. PRIOR TO COMMENCEMENT OF CONSTRUCTION**, the Permittee shall submit a final South Bay Boulevard Bridge Replacement Project Habitat Mitigation and Monitoring Plan consistent with the Draft Report dated February 2023.
- 4. Protection of Archeological Resources.** The Permittee shall comply with all the Cultural Resources Mitigation Measures identified in the "South Bay Boulevard Bridge Replacement Project ED20-217; 30455 Mitigated Negative Declaration dated April 2019" and included as Exhibit 3 as enforceable requirements of this CDP. With respect to Cultural Resource Mitigation Measure CR-1; local Native American Tribes shall be included, at their discretion, in the pre-construction archeological briefing. Moreover, with respect to Cultural Resource Mitigation Measure CR-3; local Native American Tribes known to be ethnographically and geographically affiliated with the project area shall specifically include Northern Chumash Tribal Council, yak tityu tityu yak tithini Northern Chumash Tribe, and the Salinan Tribe of Monterey and San Luis Obispo Counties, and the Permittee shall allow each tribe to be equally represented in all tribal cultural monitoring pursuant to said condition. In addition, "initial ground disturbance activities" shall be understood to mean native soil disturbance, including during the mitigation and revegetation of the project site.
- 5. Minor Modifications.** All requirements of the terms and conditions of this CDP, including related to any Executive Director-approved plans, shall be enforceable components of the CDP. Minor adjustments to the terms and conditions of this CDP, including to any special conditions and/or required plans, may be allowed by the Executive Director if such adjustments: (1) are deemed reasonable and necessary; (2) do not adversely impact coastal resources; and (3) do not legally require a CDP amendment or new CDP.
- 6. Assumption of Risk, Waiver of Liability and Indemnity.** By acceptance of this CDP, the Permittee acknowledges and agrees, on behalf of itself and all successors and assigns: (i) that the site is subject to hazards from episodic and long-term shoreline retreat and coastal erosion, high seas, ocean waves, storms, tsunamis, tidal scour, coastal and riverine flooding, and the interaction of same; (ii) to assume the risks to the Permittee and the property that is the subject of this CDP of injury and damage from such hazards in connection with this permitted development; (iii) to unconditionally waive any claim of damage or liability against the Commission, its officers, agents, and employees for injury or damage from such hazards; and (iv) to indemnify and hold harmless the Commission, its officers, agents, and employees with respect to the Commission's approval of the project against any and all liability, claims, demands, damages, costs (including costs and fees incurred in defense of such claims due to such hazards), expenses, and amounts paid in settlement arising from any injury or damage.



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**South Bay Boulevard Bridge Replacement Project  
Habitat Mitigation and Monitoring Plan**

~~DRAFT~~ February 5, 2024

**San Luis Obispo County  
Federal Project BRLS-5949(137)**

**Prepared by  
San Luis Obispo County  
Public Works Department  
Environmental Programs Division**

**November 2020  
Rev. February 2023, August 2023, February 2024**

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## Appendix

### Appendix A. USACE Monitoring Report Guidelines

## 1 Introduction

This Habitat Mitigation and Monitoring Plan (HMMP) was prepared to describe the methods proposed to mitigate for project-related impacts to federal, state, and county jurisdictional areas associated with implementation of the South Bay Boulevard Bridge Replacement Project (project). Implementation of the project is anticipated to result in temporary impacts to areas subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE), the Central Coast Regional Water Quality Control Board (RWQCB), the California Department of Fish and Wildlife (CDFW). The project site is also within the coastal zone, subject to regulation by the California Coastal Commission (CCC) and the San Luis Obispo County Local Coastal Program. The HMMP follows the guidelines presented in the Checklist for Compensatory Mitigation Proposals (USACE 2008a) and the Final Rule for Compensatory Mitigation for Losses of Aquatic Resources (USACE 2008b). The Natural Environment Study (NES) and the Biological Assessment prepared for the project fully describe the project scope and review the project-related impacts to biological resources in greater detail (County 2021a and b).

Revisions that are specific to a particular agency requirement are indicated in the text or by using footnotes (i.e., CCC, USACE, RWQCB, and CDFW).

## 2 Project and Site Description

This section identifies the responsible party for the project, provides the location of the project, and summarizes the project description. More detailed information about the physical and biological setting of the site and project description are available in the NES.

### 2.1 Responsible Parties and Financial Assurances

The County of San Luis Obispo Department of Public Works (County) is the project applicant. Therefore, the County is the party responsible for fulfilling all the mitigation obligations pursuant to the anticipated conditions of the USACE Nationwide Permit Authorization and the other pertinent regulatory permits acquired for the project. Correspondences to the County as the responsible party for the project should be sent to:

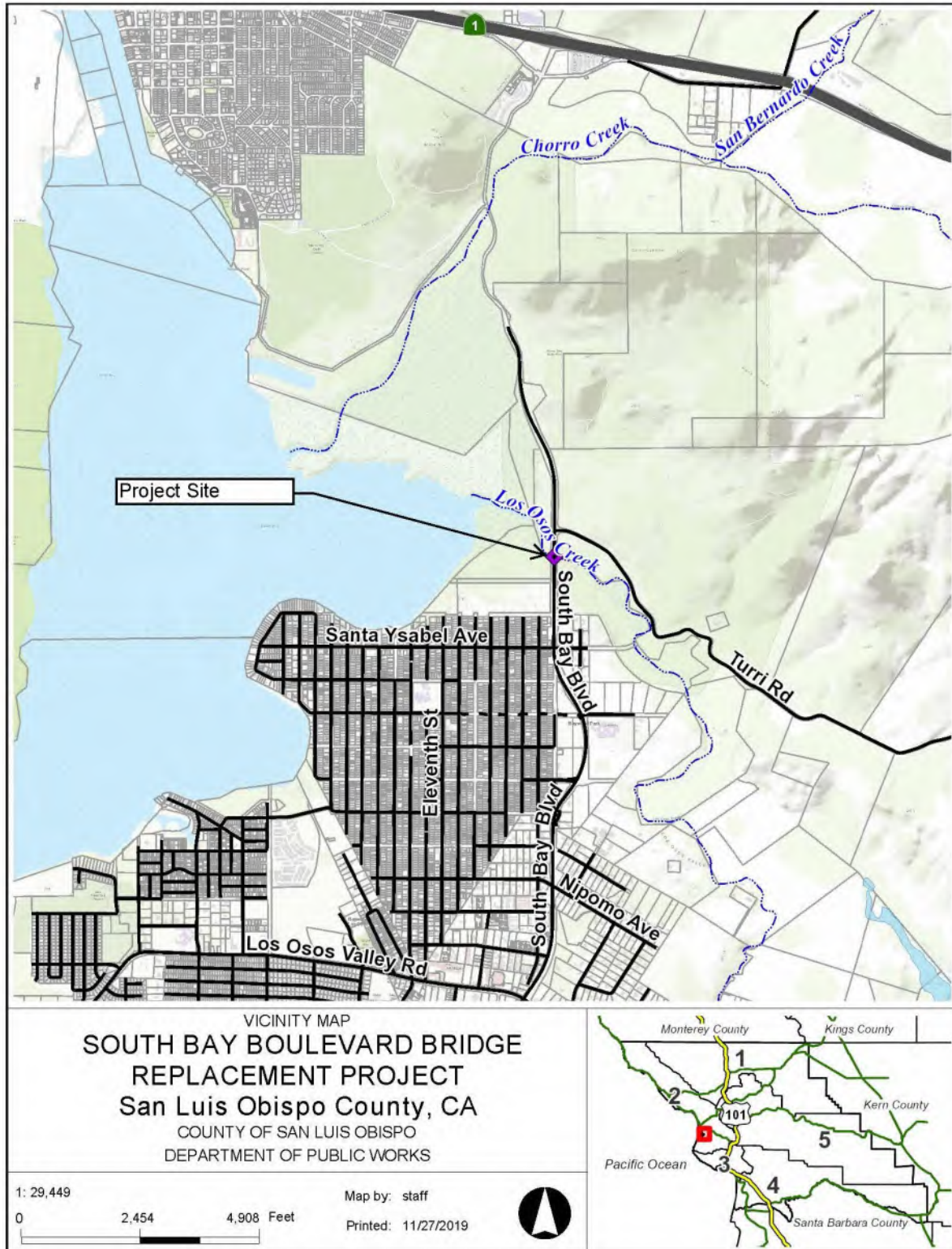
County of San Luis Obispo  
Department of Public Works  
County Government Center, Room 206  
San Luis Obispo, California 93408

The County has allocated sufficient funding in the overall project budget to implement the requirements outlined in this HMMP and any other contingency actions that may become necessary during the mitigation and monitoring phase of the project development.

### 2.2 Project Location

The South Bay Boulevard Bridge (No. 49C-0351) spans Los Osos Creek within unincorporated San Luis Obispo County, approximately 2,000 feet southeast of the City of Morro Bay, California (35.33509°N, 120.82332°W) (Figure 1). South Bay Boulevard is approximately four miles long and extends from Bay Oaks Drive near Los Osos Valley Road on the south, in the community of Los Osos, to State Route 1 on the north, near the City of Morro Bay. The project site is located within the Morro Bay South, California 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle. South Bay Boulevard is classified as a rural arterial in the County's Estero Area Plan and serves approximately 15,000 vehicles per day. The existing and proposed bridges are located within existing County right-of-way (ROW).

Figure 1: Project Location Map





## **2.3 Project Summary**

The County proposes to replace the existing South Bay Boulevard Bridge that crosses Los Osos Creek where it enters Morro Bay. The bridge has been identified as seismically deficient and the project would replace it with a modern concrete bridge that would provide adequate capacity, and reliable, safe service for the public.

The replacement bridge is proposed to be a two-span bridge, cast-in-place prestressed concrete box girder bridge. Compared to the existing bridge (189 feet long and 37 feet wide), the replacement bridge would be larger at 300 feet long and 50 feet wide. The bridge abutments and center bent would be supported on cast-in-drilled-hole (CIDH) concrete piles. The center bent would be located above the high tide line (HTL). No permanent structures or fill are expected to extend below the HTL. Excavation for the abutments would be approximately 10 to 15 feet deep, and the CIDH pile shafts would be drilled over 50 feet deep in temporary casings. If drilling slurry is used, it would be contained for off-site disposal.

Constructing the new bridge would require temporary falsework and temporary support piles, which may be located below the HTL. Temporary falsework piles would be inside shoreline cofferdams. Two temporary work trestles composed of timber and steel decking would also be installed on temporary piles, one for construction of the new bridge and one for demolition of the existing bridge. The trestles, temporary falsework, and all support piles would be removed completely when construction is complete.

Constructing the new bridge center support and removing the existing bridge piles during demolition would require dewatering below the HTL. Dewatering would be limited to localized shoreline construction zones; creek flow would not be blocked or diverted at any time.

The road approaches along South Bay Boulevard would be realigned to align with the new bridge. The road approach realignment would be the minimum necessary to safely approach the new bridge and the South Bay Boulevard - Turri Road intersection would remain as is.

Construction staging would be in the County right-of-way on South Bay Boulevard to the north and south of the bridge. A secondary staging and material storage area would be established south of the bridge at the east end of Santa Ysabel Avenue.

Temporary construction impacts may impact up to approximately 0.3 acre below the HTL in Los Osos Creek for dewatering areas and the work trestles. This area would likely be split between year 1 and year 2 construction impacts (i.e., would not impact the entire area for both construction seasons). This impact area may include temporary impacts in salt marsh located under and adjacent to the bridge.

Temporary construction impacts in uplands would include approximately 0.6 acre of upland historic fill area that has been colonized by a federally protected plant, Morro manzanita. Temporary construction impacts in uplands would also affect other Environmentally Sensitive Habitat Areas (ESHA) and ruderal/disturbed lands. These areas are proposed to be restored to pre-existing conditions, or in the case of ruderal habitats, enhanced as part of the proposed mitigation.

Permanent impacts from constructing the new bridge are limited to the bridge foundations, center pier, and realigned road approaches, all of which would be above the HTL and outside of wetlands. No permanent impacts below the HTL or in wetlands are anticipated.

Permanent impacts in uplands would affect approximately 0.24 acre of Morro manzanita habitat, and 0.08 acre of native oak woodland. Mitigation is proposed at a 3:1 replacement ratio.

Construction is expected to take approximately two years to complete. Construction activities below the HTL would be restricted to the dry season (June 1 to October 31) to take advantage of

lower creek flow and reduced likelihood of precipitation. Generally, construction of the new bridge is expected to occur in year 1 and demolition of the old bridge in year 2.

For the purposes of this HMMP, the project limits include the entire project site and all the project elements outlined in the project description. The project limits are depicted as the Project Impact Area (PIA; red line) in Figures 2a, 2b, and 2c.

Figure 2a: Project Impact Areas (north) [Fig 3a from NES]

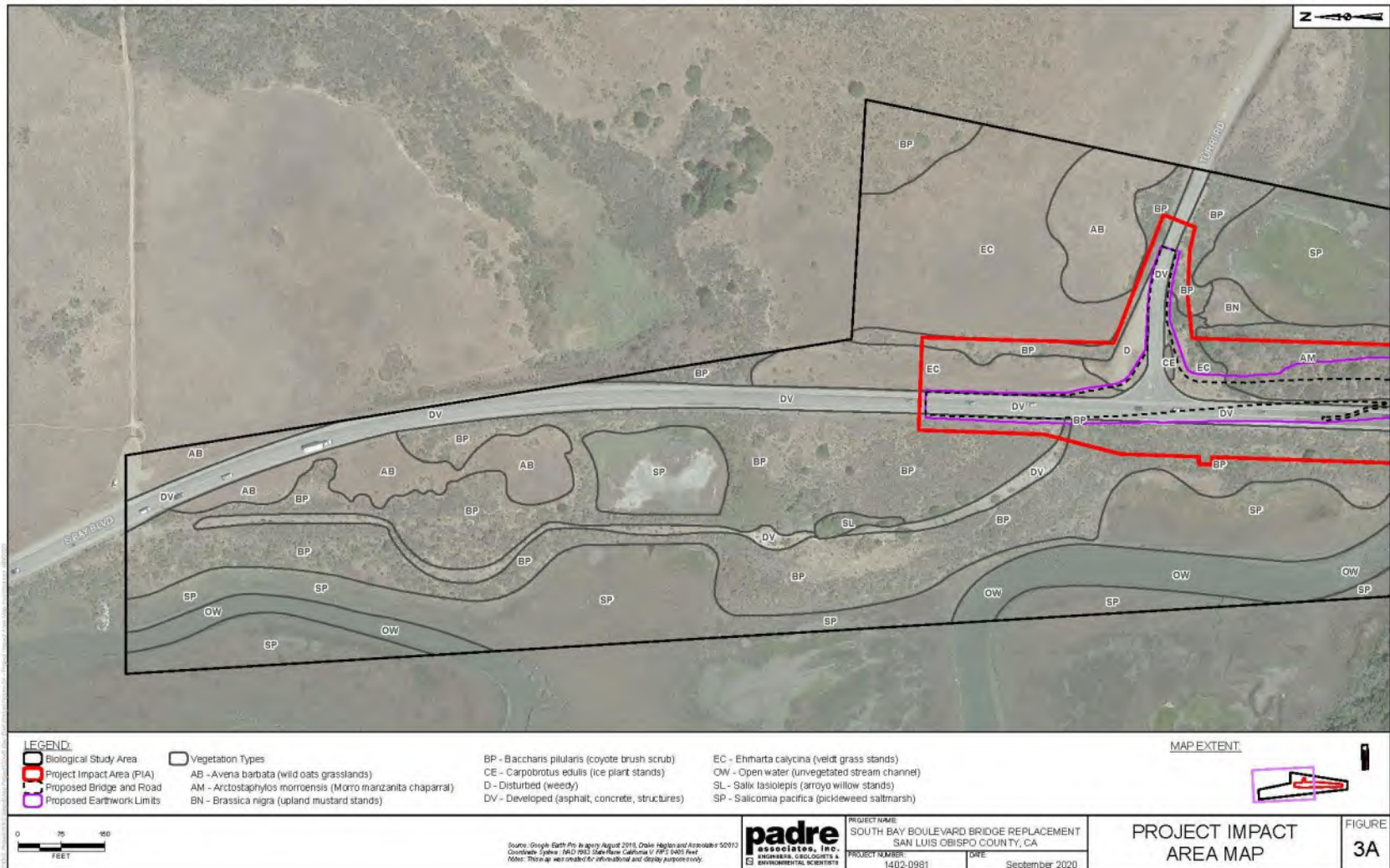




Figure 2b: Project Impact Areas (south) [Fig 3b from NES]

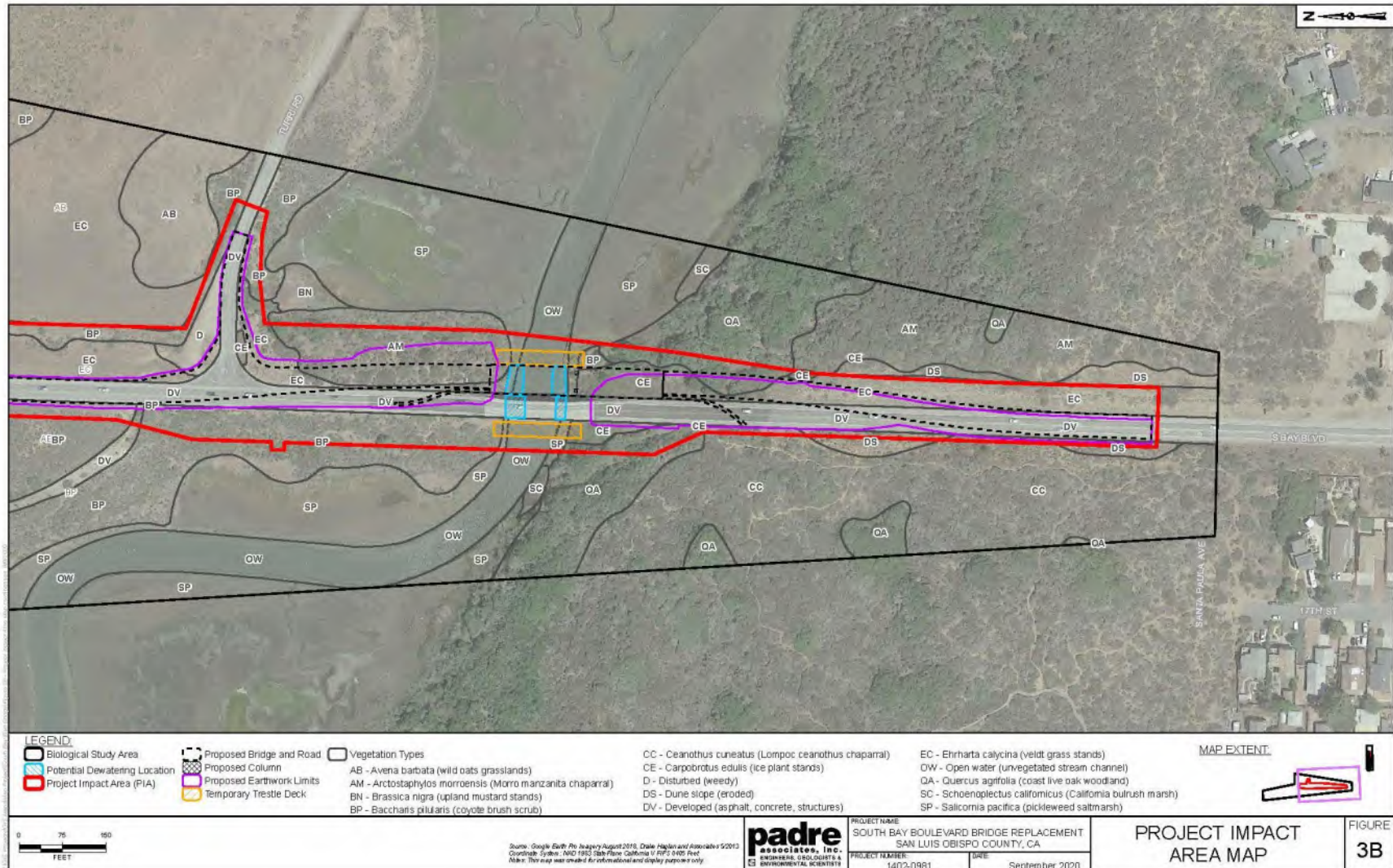


Figure 2c: Project Impact Areas (Santa Ysabel Avenue) [Fig 3c from NES]





## 2.4 Existing Conditions

The Biological Study Area (BSA) was identified based on preliminary bridge designs provided by the design engineer, and includes the bridge construction impact area, construction staging areas, potential mitigation areas and a minimum 100-foot-wide buffer. The BSA is approximately 49 acres in size and is shown as the black line in Figures 2a, 2b, and 2c above from the NES. The BSA and surrounding areas are primarily public lands including the El Moro Elfin Forest, Morro Bay State Park, and Morro Bay State Marine Reserve.

Current land use of the BSA and surrounding areas includes flood conveyance, livestock grazing (northeast of the bridge site), residential (west of South Bay Boulevard near Santa Ysabel Avenue), institutional (Church of the Nazarene), and conservation areas (El Moro Elfin Forest, Morro Bay State Park, Morro Bay State Marine Reserve, Morro Estuary Natural Preserve).

The County monitors stream flow in Los Osos Creek at the Los Osos Valley Road bridge, located approximately three miles upstream of the BSA. Stream flow data recorded at this station includes 3,769 acre-feet/year (AFY) average flow, 2,220 AFY median flow and 19,270 AFY maximum flow (in 1995). Upper portions of Los Osos Creek may become dry in the summer; however, tidal influence provides year-round surface water within the BSA. The BSA includes approximately 1,300 linear feet of the Los Osos Creek channel, and the creek is tidal at the existing and proposed bridge locations.

Within the BSA, the smaller PIA was defined based on the 65% design plans and anticipated limits of temporary and permanent impacts. The PIA is the red line in Figures 2a, 2b, and 2c from the NES. The PIA forms the basis of the project impacts and mitigation requirements in this HMMP. The PIA is approximately 7.7 acres, of which approximately 3.3 acres is pavement and 4.4 acres is non-pavement.

## 3 Habitat Types and Jurisdictional Areas

Thirteen vegetation communities/land cover types were identified within the BSA during the field surveys conducted for the NES including: wild oats grassland, Morro manzanita chaparral, upland mustard stands, coyote brush scrub, Lompoc ceanothus chaparral, ice plant stands, eroded dune slope, veldt grass stands, coast live oak woodland, pickleweed salt marsh, California bulrush marsh, arroyo willow stands, and disturbed areas.

Of these communities, the following meet the definition of Environmentally Sensitive Habitat Areas (ESHA) based on proximity to the Morro Bay estuary and/or presence of special-status species: Morro manzanita chaparral, Lompoc ceanothus chaparral, eroding dune slope, coyote brush scrub, coast live oak woodland, pickleweed salt marsh, California bulrush marsh, and arroyo willow stands. The California bulrush marsh and arroyo willow stands are outside the PIA and would not be impacted by the project. The characteristics of the ESHA communities in the PIA as described in the NES are summarized below.

### 3.1 Vegetation Communities

**Morro Manzanita Chaparral.** This community is dominated by Morro manzanita (*Arctostaphylos morroensis*), chamise (*Adenostoma fasciculatum*), and black sage (*Salvia mellifera*). Other species found in this community within the BSA include California sagebrush (*Artemisia californica*), Lompoc ceanothus (*Ceanothus cuneatus* var. *fascicularis*), and mock heather (*Ericameria ericoides*). This vegetation community has been assigned a rarity ranking of S1, meaning it is critically imperiled at the State level.

**Coyote Brush Scrub.** This community is co-dominated by coyote brush (*Baccharis pilularis*) and California sagebrush. Approximately eight Morro manzanita shrubs as well as Coast live oak (*Quercus agrifolia*) saplings and patches of arroyo willow (*Salix lasiolepis*) occur within

the community northwest of the bridge. This vegetation community has been assigned a rarity ranking of S5, meaning it is secure at the State level. However, in the project area it meets the definition of ESHA pursuant to Section 30107.5 of the Coastal Act because it includes Morro manzanita and may provide suitable habitat for Morro shoulderband snail (BA Section 4.2.11).

**Lompoc Ceanothus Chaparral.** This community is dominated by Lompoc ceanothus, mock heather and chamise. Other species occurring in this community are black sage, bush monkeyflower (*Diplacus aurantiacus*) and Morro manzanita. *Ceanothus cuneatus* var. *fascicularis* chaparral communities have been assigned a rarity ranking of S4, meaning it is apparently secure at the State level. However, this species is listed by the California Native Plant Society as having limited distribution. Therefore, they individual plants removed for construction will be replaced at a 1:1 ratio in accordance with the California Coastal Commission recommendations (CCC 2021).

**Eroded Dune Slope.** This term is used to describe the vegetation of the eroded dune slope along South Bay Boulevard south of the bridge. These areas appear to be partially eroded due to the loss of chaparral shrubs. Common species found in this community include telegraph weed (*Heterotheca grandiflora*), rat-tail fescue (*Festuca myuros*), California croton (*Croton californicus*), narrow-leaf spineflower (*Chorizanthe angustifolia*), deerweed (*Acemisson glaber* var. *glaber*) and mock heather seedlings.

**Coast Live Oak Woodland.** This community is dominated by coast live oak trees (*Quercus agrifolia*), but also includes patches of shrubs found in Morro manzanita chaparral. This vegetation community has been assigned a rarity ranking of S4, meaning it is apparently secure at the State level.

**Pickleweed Salt Marsh.** This community is dominated by pickleweed (*Salicornia pacifica*), alkali heath (*Frankenia salina*), jaumea (*Jaumea carnosa*), saltgrass (*Distichlis spicata*) and seaside arrowgrass (*Triglochin concinna*). Watson's saltbush (*Atriplex watsoni*) occurs with saltgrass on the upper margins of the salt marsh. Within the BSA, pickleweed salt marsh is limited to tidally influenced areas at/below the HTL in Los Osos Creek. This vegetation community has been assigned a rarity ranking of S3, meaning it is vulnerable, at moderate risk of elimination at the State level.

**Limited Distribution Species.** In addition to Lompoc ceanothus, discussed above, special-status plants present in the PIA that are listed by the California Native Plant Society as having limited distributions include Suffrutescent wallflower (*Erysimum suffrutescens*) and southwestern spiny rush (*Juncus acutus* ssp. *leopoldii*). Individual plants that are removed for construction will be replaced at a 1:1 ratio in accordance with the CCC recommendations (CCC 2021).

**Other.** As described in the NES (Table 9 of NES), other vegetation communities include arroyo willow stands, veldt grass stands, iceplant stands, and disturbed land (e.g., the Turri Road pullout). While there are willow stands in the BSA, no willow stands occur in the PIA. Iceplant stands occur along the road embankments and are dominated by dense stands of freeway iceplant (*Carpobrotus edulis*).

The veldt grass stands occur primarily along the eastern shoulder of South Bay Boulevard and are dominated by ruderal, non-native species that typically displace more desirable native vegetation in such settings. The veldt grass stands are dominated by veldt grass (*Ehrharta calycina*), but contain other non-native species such as slender wild oats, red brome, ripgut grass, and red-stem filaree.

### **3.2 Los Osos Creek Channel**

The project site is located at the lower reach of Los Osos Creek where it empties into Morro Bay; the creek is tidal at the project site. The open water channel is approximately 70 to 100 feet wide and is bordered by narrow (2 to 20 feet wide) shoreline saltmarsh on both banks within the PIA.

### **3.3 Jurisdictional Areas**

The Los Osos Creek channel and adjacent wetlands are subject to the jurisdiction of the USACE (Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act), RWQCB (Section 401 of the Clean Water Act), the California Department of Fish and Game (CDFW), and the California Coastal Commission (CCC). The jurisdictional boundary consists of the HTL (7.0 feet NAVD88), which is also the landward limit of salt marsh and top of bank (Figure 4).

The Morro manzanita chaparral is an upland vegetation community but contains the federally threatened Morro manzanita. Impacts to this species would be subject to Section 7 of the Federal Endangered Species Act.

The project is within the coastal zone, including areas subject to approval by the California Coastal Commission and areas outside Original Coastal Jurisdiction subject to the Local Coastal Program approval. A Coastal Development Permit would be obtained, and would include consideration of the ESHA described in Section 3.1. As of May 4, 2021, the Local Coastal Program agreed to a consolidated permit process and submitted a request to the CCC to process and act upon a consolidated permit.

### **3.4 Anticipated Impacts to Jurisdictional Habitats**

Implementation of the project will result in temporary impacts to portions of Los Osos Creek below the HTL (Figure 4). The project is not anticipated to result in any adverse permanent impacts below the HTL. Permanent beneficial impacts below the HTL will include removal of the existing bridge piers from the channel (two rows of nine concrete 1.5-ft diameter piers). Temporary construction impacts below the HTL will include support piles for two temporary construction trestles and shoreline dewatering areas to accomplish installation of the new bridge support (construction year 1) and removal of the existing bridge support (construction year 2).

Temporary impacts below the HTL have the potential to impact pickleweed salt marsh. Impacts to salt marsh will be avoided and minimized to the extent possible in the final design configuration of trestle piles and dewatering areas.

The project will also result in temporary impacts to 0.6 acre (4 individual shrubs, plus two just outside the mapped PIA), and permanent impacts to 0.24 acre (13 shrubs), of Morro manzanita chaparral, which is located in upland areas above the HTL (Figure 2b). Approximately five additional Morro manzanita shrubs are located in the coyote brush scrub on the northwest side of the bridge and have the potential to be temporarily impacted for construction. Approximately 17 additional Morro manzanita shrubs are located in the native oak woodland on the southeast side of the bridge and have the potential to be permanently impacted for road realignment. Three shrubs are just outside the mapped PIA and have the potential to be impacted during construction. Approximately 11 shrubs are located southwest of the bridge, plus an additional two shrubs just outside the mapped PIA, and have the potential to be impacted for construction. The proposed temporary and permanent impact areas contain approximately 23 and 30 individual shrubs, respectively, that may be removed by the project. The County expects that most, if not all, of the temporary shrub impacts can be avoided entirely by reconfiguring the construction impact areas but this will need to be confirmed prior to construction.

The project would result in temporary impacts to 0.34 acre, and permanent impacts to 0.08 acre, of coast live oak woodland (Figure 2b). Based on the May 4, 2020, tree survey, approximately

thirty mature coast live oak trees are located within the PIA, including in the area mapped as coast live oak woodland and in other habitat types. It is estimated that approximately 15 to 20 trees, possibly a maximum of 25 trees, may need to be removed for construction. These tallies count multiple limbs greater than 4-inch diameter at breast height (DBH) as separate trees.

Impacts to the remaining ESHA types, Lompoc ceanothus chaparral, coyote brush scrub, and dune slope would be limited to temporary construction disturbance.

The anticipated impacts to jurisdictional areas, upland ESHA, and protected plants are summarized below in Tables 1a, 1b, and 1c, respectively. Potential for indirect impacts would be avoided with implementation of the mitigation measures provided in the NES. The County proposes 1:1 restoration of temporary impact areas, 3:1 mitigation for permanent impacts to Morro manzanita chaparral and coast live oak woodland, 3:1 replacement of individual Morro manzanita shrubs and 4:1 replacement of oak trees.

The CCC has indicated that they consider temporary impacts that can't be restored to pre-existing conditions within one year to be permanent impacts (CCC 2022). The CCC has also indicated that they require 4:1 mitigation for impacts to salt marsh and 3:1 mitigation for impacts to Morro manzanita chaparral.

The impacts shown in the tables below represent a likely worst-case scenario. Direct impacts would be avoided and minimized to the extent possible as determined during the final project design and based on pre-construction coordination with the contractor. This would include an on-site discussion of specific construction access and staging requirements and feasible alternatives to construction configuration to reduce temporary impacts. The goal would be to avoid and minimize temporary impacts to salt marsh, oak woodland, and Morro manzanita chaparral (and individual shrubs) to the greatest extent possible. The project impacts and associated mitigation requirements would be adjusted in accordance with the results of the coordination. The appropriate regulatory agency notifications would be made to adjust permitted impacts and required mitigation if necessary.

Pre-construction surveys and coordination with the contractor that could result in reductions in project impact areas are included in the proposed pre-construction surveys listed in Table 2.

Finally, the quantification of project impacts and mitigation areas in this draft HMMP are based on the 65% design plans. Project impacts and mitigation areas will be revisited and revised if needed based on the design plans as they progress until 100% design is complete.

A summary of potential future revisions to the impacts and mitigation areas provided in the HMMP includes:

- Review based on subsequent design plans;
- Changes based on requirements of agency permits; and
- Proposed pre-construction review with the contractor to avoid and minimize impacts.

Changes from each of these steps would be incorporated into a final HMMP.

**Table 1a. Summary of Impacts to Jurisdictional Habitats and Proposed Restoration and Mitigation (in acres)**

|                                                    |                         | Temporary         |                                              |                               |                               | Permanent         |                                               |                  | Overall Total                                     |
|----------------------------------------------------|-------------------------|-------------------|----------------------------------------------|-------------------------------|-------------------------------|-------------------|-----------------------------------------------|------------------|---------------------------------------------------|
| Feature Type                                       | Regulatory Jurisdiction | Temporary Impacts | USACE/RWQCB/ CDFW 1:1 Restoration (in place) | Additional 3:1 CCC Mitigation | Total Mitigation <sup>1</sup> | Permanent Impacts | Proposed 3:1 Mitigation for Permanent Impacts | Total Mitigation | Temporary plus Permanent Impacts Mitigation Total |
| <b>Waters, Wetlands, and Bank</b>                  |                         |                   |                                              |                               |                               |                   |                                               |                  |                                                   |
| Tidal Wetlands (pickleweed salt marsh)             | USACE, RWQCB, CDFW, CCC | 0.11              | 0.11                                         | 0.33                          | 0.44                          | 0                 | 0                                             | 0                | 0.44                                              |
| Channel (non-wetland waters below HTL/top of bank) | USACE, RWQCB, CDFW, CCC | 0.38 <sup>2</sup> | 0.38                                         | 0.00                          | 0.38                          | 0                 | 0                                             | 0                | 0.38                                              |
| <b>Total</b>                                       |                         | <b>0.49</b>       | <b>0.49</b>                                  | <b>0.33</b>                   | <b>0.82</b>                   | <b>0</b>          | <b>0</b>                                      | <b>0</b>         | <b>0.82</b>                                       |

1 – Total Mitigation for temporary impacts in this column includes restoration of the temporary impact area plus additional mitigation.

2 - Trestle piles footprints and dewatering areas total 0.11 acre of unvegetated channel; the entire channel area from west to east trestle is 0.38 acre, providing the maximum potential area of substrate effects to provide the most conservative estimate.



**Table 1b. Summary of Impacts to Upland ESHA and Proposed Restoration and Mitigation (in acres)**

|                             |                         | Temporary         |                                              |                                            |                               | Permanent         |                                               |                  | Overall Total                                     |
|-----------------------------|-------------------------|-------------------|----------------------------------------------|--------------------------------------------|-------------------------------|-------------------|-----------------------------------------------|------------------|---------------------------------------------------|
| Feature Type                | Regulatory Jurisdiction | Temporary Impacts | USACE/RWQCB/ CDFW 1:1 Restoration (in place) | Additional 2:1 CCC Mitigation <sup>1</sup> | Total Mitigation <sup>2</sup> | Permanent Impacts | Proposed 3:1 Mitigation for Permanent Impacts | Total Mitigation | Temporary plus Permanent Impacts Mitigation Total |
| <b>Upland ESHA Habitats</b> |                         |                   |                                              |                                            |                               |                   |                                               |                  |                                                   |
| Morro manzanita chaparral   | USFWS, CCC              | 0.60              | 0.60                                         | 1.2                                        | 1.8                           | 0.24              | 0.72                                          | 0.72             | 2.52                                              |
| Lompoc ceanothus chaparral  | CCC                     | 0.08              | 0.08                                         | 0                                          | 0.08                          | 0                 | 0                                             | 0                | 0.08                                              |
| Coyote brush scrub          | CCC                     | 1.37              | 1.37                                         | 0                                          | 1.37                          | 0                 | 0                                             | 0                | 1.37                                              |
| Coast live oak woodland     | CCC                     | 0.34              | 0.34                                         | 0                                          | 0.34                          | 0.08              | 0.24                                          | 0.24             | 0.58 <sup>3</sup>                                 |
| Dune slope (eroding)        | CCC                     | 0.1               | 0.1                                          | 0                                          | 0.1                           | 0                 | 0                                             | 0                | 0.1                                               |
| <b>Total</b>                |                         | <b>2.49</b>       | <b>2.49</b>                                  | <b>1.88</b>                                | <b>4.37</b>                   | <b>0.32</b>       | <b>0.96</b>                                   | <b>0.96</b>      | <b>5.33</b>                                       |

1 – CCC requires 3:1 mitigation for temporary impacts to Morro manzanita chaparral and native oak woodland. Restoration of temporary construction impact areas counts for one third; an additional 2/3 or 2:1 acreage is required.

2 - Total Mitigation for temporary impacts in this column includes restoration of the temporary impact area plus additional mitigation.

3 – Proposed oak plantings will be in areas totaling a minimum of approximately 1 acre.

**Table 1c. Summary of Impacts to Vegetation and Proposed Restoration and Mitigation (in plant counts)**

| Feature Type                        | Regulatory Jurisdiction | Temporary Impacts | Mitigation | Permanent Impacts | Mitigation | Total Mitigation |
|-------------------------------------|-------------------------|-------------------|------------|-------------------|------------|------------------|
| <b>Regulated Plants<sup>1</sup></b> |                         |                   |            |                   |            |                  |
| Morro manzanita plants <sup>2</sup> | USFWS, CCC              | 23 plants         | 23 plants  | 30                | 90         | 113 plants       |
| Coast live oak trees                | CCC                     | 16 trees          | 64 trees   | 9                 | 36         | 100 trees        |
| Lompoc ceanothus                    | CCC                     | 50 plants         | 50 plants  | 0                 | 0          | 50 plants        |

1 – Not listed: several suffrutescent wallflower and three southwestern spiny rush that, if impacted by the project, will be replaced as part of restoration plantings in accordance with CCC recommendations (wallflower in chaparral communities and spiny rush in channel edge environments adjacent to salt marsh).

2 - Morro manzanita shrub counts are “worst case;” the County expects these numbers to be lower based on review of construction impact areas.

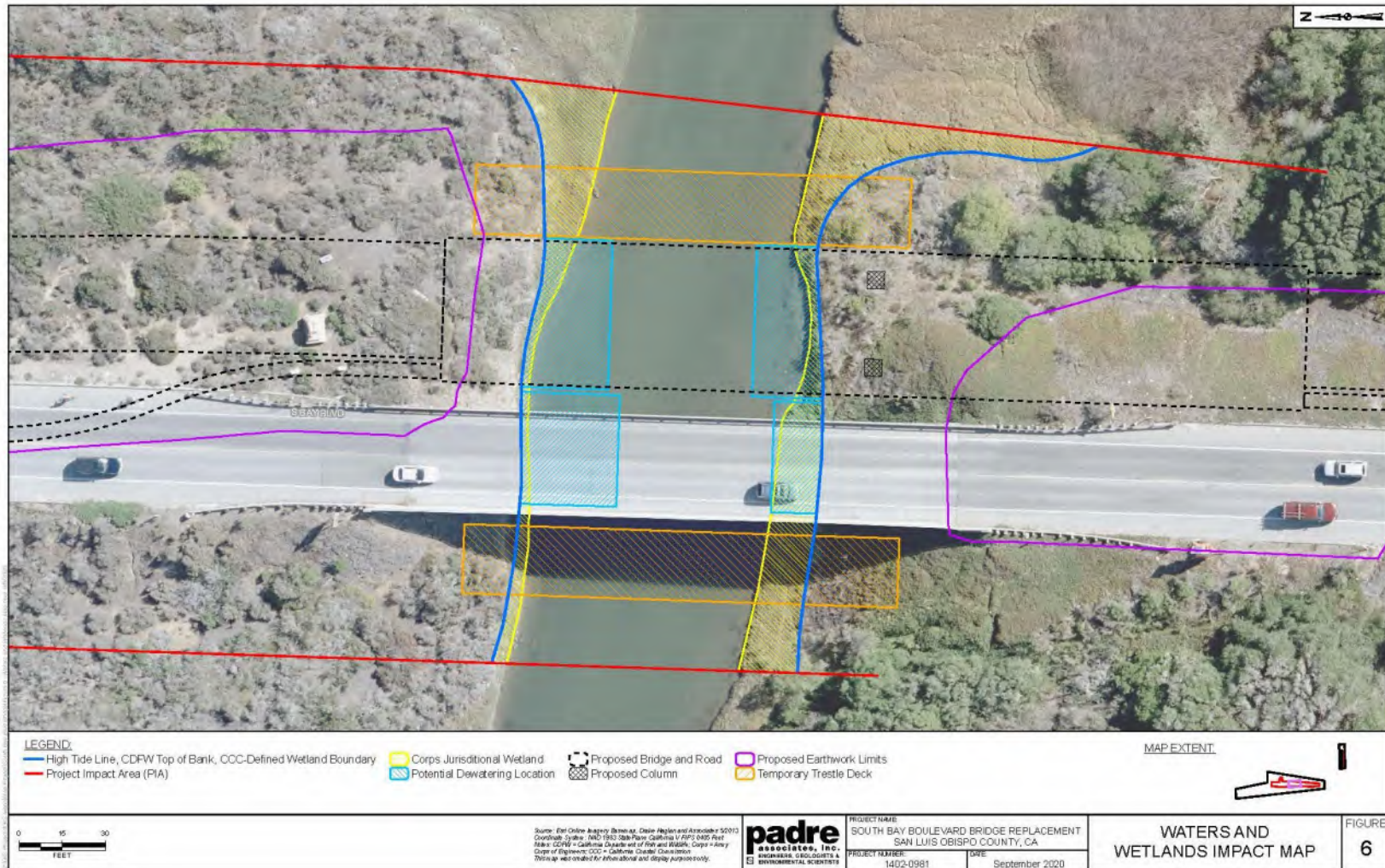
**Table 2. Summary of Past Field Surveys and Proposed Pre-Construction Recommendations**

| Survey Type                                                                   | Most Recent Survey Date                                                              | Recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Botanical</b>                                                              |                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Special-status plants                                                         | May 2020 (NES)                                                                       | a) 1 year prior to construction generate current CNDDDB list and conduct seasonal surveys [NES plant surveys were conducted in <b>March</b> and <b>May</b> to encompass the flowering period for most of the reported special-status species].                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Native Oak                                                                    | October 2015 (30% Design Plans)<br>May 2016 (NES)<br>October 2021 (65% Design Plans) | a) Prior to construction confirm native oak map in the field.<br>b) Pre-construction meeting with contractor to avoid/minimize impacts.<br>c) Document reduced impacts and reduced mitigation requirements in <b>HMMP</b> and with permit agencies.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Morro manzanita                                                               | May 2016 (NES)<br>March 2022 (northwest of bridge)                                   | a) Prior to construction confirm Morro manzanita map in the field.<br>b) Pre-construction meeting with contractor to avoid/minimize impact.<br>c) Document reduced impacts and reduced mitigation requirements in <b>HMMP</b> and with permit agencies.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Lompoc ceanothus<br>( <i>Ceanothus cuneatus</i> var.<br><i>fascicularis</i> ) | May 2020 (NES)                                                                       | a) Prior to construction confirm count in project impact areas [NES states 50 shrubs in PIA]<br>b) CCC will require 1:1 replacement (in chaparral habitat restoration areas)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Suffrutescent wallflower<br>( <i>Erysimum suffrutescens</i> )                 | May 2020 (NES)                                                                       | a) Prior to construction confirm count in project impact areas [NES states "several" occur in PIA]<br>b) CCC will require 1:1 replacement (in chaparral habitat restoration areas)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Southwestern spiny rush<br>( <i>Juncus acutus</i> ssp.<br><i>leopoldii</i> )  | May 2020 (NES)                                                                       | a) Prior to construction confirm count in project impact areas [NES states 3 occur in PIA]<br>b) CCC will require 1:1 replacement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Jurisdictional<br/>determination<br/>(NES App. D)</b>                      | May 12, 2016 (NES Appendix)<br>May 2020 (NES Update)<br>June 2021 (confirmation)     | a) Prior to construction confirm delineation and/or resurvey salt marsh and confirm no eelgrass in PIA.<br>b) Pre-construction meeting with contractor to avoid/minimize impacts.<br>c) Document reduced impacts and reduced mitigation requirements in <b>HMMP</b> and with permit agencies.                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Special-status wildlife</b>                                                |                                                                                      | a) Pre-construction surveys for CRLF, MSS, CA brackish water snail, coast horned lizard, northern CA legless lizard, burrowing owl, American badger                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| California red-legged frog                                                    | May 12, 2016 (NES, nighttime eye-shine survey)                                       | a) Assumed present.<br>b) CRLF PBO Mitigation measures are adequate to protect and require pre-construction and construction monitoring, including: <b>Measure 3</b> : A USFWS-approved biologist will survey the Project site no more than 48 hours before the onset of work activities; and <b>Measure 5</b> : A USFWS-approved biologist will be present at the work site until all California red-legged frogs have been relocated out of harm's way, workers have been instructed, and disturbance of habitat has been completed. After this time, the State or local sponsoring agency will designate a person to monitor on-site compliance with all minimization measures. |

| Survey Type              | Most Recent Survey Date                                                                                                          | Recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          |                                                                                                                                  | c) Dip net or nighttime eye-shine surveys not required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Morro shoulderband snail | September 2018                                                                                                                   | Pre-construction and during construction, implement USFWS survey recommendations from NES: A USFWS-approved biologist will survey the PIA (and any other areas where take may occur) for Morro shoulderband snail that may be present. Any identified individuals, in all life stages, will be captured and moved out of harm's way. Field surveys described above will be conducted within one week prior to commencement of initial ground disturbance activities within or adjacent to vegetation, including vegetation removal, materials staging, and any earthwork.                                                                                               |
| Tidewater goby           | September-November 2015 (NES Appendix C, focused presence/absence protocol survey)                                               | a) Assumed present.<br>b) During construction, implement NES mitigation measures, including: A qualified, USFWS-authorized biologist shall monitor installation of the approved dewatering containment system and all dewatering activities that could impact tidewater goby and their habitat; and Dewatering operations shall be halted periodically to allow the qualified USFWS-approved biologists to seine the exclusion area for additional trapped fishes and aquatic organisms. All captured organisms shall be immediately released into areas of the creek that will not be affected by dewatering.<br>c) New protocol surveys are not required.             |
| California black rail    | March and April, 2016 (NES Appendix F, broadcast calls)                                                                          | a) Conduct pre-construction literature review for occurrences in Morro Bay.<br>b) Most recent documentation for Morro Bay is confirmed calls in 2005 and unconfirmed in 2009-2010 survey. If no more recent confirmed sightings are documented at time of construction, a new survey is not required.<br>c) If there have been more recent sightings in the vicinity, determine if a repeat of the breeding period (Mar. 15 – May 31) survey is warranted prior to construction start. Decision may include consideration of proximity of suitable habitat (bulrush west of bridge) to construction disturbance and/or if standard nesting bird surveys are sufficient. |
| Marine mammal survey     | June 6, 2016 (NES Appendix J; overwater survey at high tide during peak pupping season and within a month of construction start) | a) Prior to construction review current NMFS documented haul-outs and rookeries in Morro Bay and compare to list in NES App. J. If no new sites are listed closer to the PIA, no survey required.<br>b) If new sites closer to the PIA are included, coordinate with NMFS on need for a pre-construction survey.                                                                                                                                                                                                                                                                                                                                                        |
| Nesting birds            | NA                                                                                                                               | Pre-construction nesting bird surveys for vegetation removal Feb. 1 – Sep. 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Swallows                 | 2016 (NES)<br>2021, 2022 nesting observed                                                                                        | Prior to construction install exclusion measures on bridge (consider exclusion measures on the east side only of the existing bridge for construction season; and the west side only of the new bridge for demolition, to provide nesting area for swallows during each season <sup>1</sup> ).                                                                                                                                                                                                                                                                                                                                                                          |

<sup>1</sup> – The suggestion to allow swallow nesting on one side of the bridge during each construction season was made by the Morro Coast Audubon Society in comments on the CEQA MND (email dated 8-4-2021). During discussion of permit issues in November 2022, CCC suggested that nearby construction disturbances may be detrimental to nesting birds. A plan to allow bird nesting on the non-construction side of the bridges during construction would be in conflict with the CCC recommended setbacks from nesting birds, and will not be implemented.

Figure 3: Jurisdictional Features at Los Osos Creek [Fig. 6 from NES]





### 3.5 Functions and Values Assessment

Los Osos Creek, shoreline salt marsh, and adjacent upland vegetation communities provide important habitat, including shelter, shade, cover, breeding, and foraging habitat, for a variety of aquatic, estuarine, and terrestrial wildlife species. Streams and estuarine tributaries serve as migration and movement corridors for aquatic and terrestrial species.

**Creek.** The creek and shoreline areas provide fish habitat and support species such as tidewater goby, steelhead, and marine and aquatic birds. The Biological Assessment for the project concluded that Los Osos Creek in the project area does not provide breeding habitat for tidewater goby or steelhead, but provides a migration corridor. These areas also provide habitat for riparian species.

Los Osos Creek and its floodplain provide important hydrologic functions, including estuarine tidal exchange and flood storage. Shoreline and floodplain vegetation communities provide water quality renovation functions.

Unvegetated channel areas provide soft-bottom benthic community habitat. The muddy intertidal shoreline in the project area includes scattered rocks that were placed for shoreline stabilization when the bridge was built. These provide cover for crabs and other motile species.

**Salt marsh.** The PIA is in close proximity to broad expanses of salt marsh bordering Los Osos Creek upstream and downstream of the existing bridge. Channel tidal flats and nearby marshes provide expansive habitat areas removed from human disturbance with mosaics of marsh and open water that provide substantially higher-value habitat than the salt marsh in the PIA.

The salt marsh in the project area is limited to narrow marshes bordering the channel that range from roughly 1 to 20 feet wide on the south bank and 1 to 10 feet wide on the north bank. The north bank salt marsh is situated on a rocky slope established when the bridge was built, at slopes of roughly 1:1 to 2:1. Vegetation between the rocks on the north bank is dense (75 to 90% cover). The south bank marsh is flatter beneath the bridge and on a steep rock bank to the east, with 25 to 90% cover. Areas lacking vegetative cover consist of animal trails, rocks, and muddy substrate. The rock that was placed when the existing bridge was built stabilizes the marsh edge on both banks.

The salt marshes in the project areas provide shoreline foraging areas for motile aquatic species during higher stages of the tide, resulting in contiguous foraging areas along both creek banks. However, the narrow width of the marshes, lack of complexity (such as channel networks), proximity to human disturbance, steep terrain, and lack of high-value buffers substantially limit their value as nesting and nursery, cover, and foraging habitat.

**Upland communities.** Upland vegetation communities provide habitat for terrestrial species, migratory birds, and raptors. Special-status species may also occur in this area, such as California red-legged frog, coast horned lizard, and northern California legless lizard. The vegetation communities in the project area support several special-status plants, including Morro manzanita, Lompoc ceanothus, and suffrutescent wallflower.

Some of the upland vegetation communities in the project area have suitable habitat elements to support Morro shoulderband snail, although no live snails have been documented in the project area.

The relative values of upland community functions are increased by proximity to Morro Bay estuary and the ocean coastline, and because surrounding lands consist primarily of undeveloped park lands. The native oak woodland, Morro manzanita chaparral, and coyote brush scrub habitats serve as a buffer between the creek and bay and the developed lands and human

disturbance associated with the road. Buffer functions include stormwater attenuation, water quality renovation, debris trapping, and nesting, foraging and cover for wildlife.

## 4 Goals of the Habitat Mitigation and Monitoring Plan

Implementation of this HMMP will restore temporary impacts and mitigate for permanent impacts to jurisdictional areas and ESHA. This HMMP addresses the project-related impacts to USACE, CDFW, RWQCB, and coastal jurisdictional areas using on-site and in-kind habitat restoration and enhancement within the creek channel and upland habitats in the PIA.

The County anticipates being able to provide all necessary mitigation within the PIA (Table 3 and Figures 4a and 4b) with the possible exception of an additional 3:1 mitigation area for salt marsh required by the CCC. In the event additional mitigation areas are required, consideration will be given to additional areas within the BSA (described in the NES), or elsewhere in the same watershed if necessary.

### 4.1 Mitigation Strategy

**Overview.** The proposed mitigation strategy has been developed based on the impacts shown in the draft 65% level design plans, and with the goal of providing adequate and appropriate restoration and in-kind/on-site mitigation. The following apply to the strategy:

- Standard mitigation ratios for jurisdictional impacts are proposed (i.e., 1:1 restoration of temporary impacts, 3:1 mitigation for permanent impacts).
- The CCC requires additional mitigation for temporary impacts to salt marsh and Morro manzanita chaparral (see Section 3.4) (CCC 2022).
- The USFWS BO for the project requires that the final mitigation and monitoring strategy be developed in collaboration with the USFWS (Reasonable and Prudent Measure 3, USFWS BO, dated April 26, 2022). Collaboration was commenced in August 2022, and is on-going.
- The CCC requested that proposed mitigation areas be adjusted to minimize the establishment of mitigation areas adjacent to areas with a predominance of non-native, invasive vegetation. To accomplish this, the County added additional mitigation areas in County right-of-way along South Bay Boulevard, and eliminated the proposed mitigation area along Santa Ysabel Avenue.
- The County is proposing to review details of temporary project impacts with the contractor prior to construction with the goal of reducing impacts to the extent feasible, particularly in salt marsh, Morro manzanita chaparral, and oak woodland. Any reductions in the impact areas that result from such coordination will be documented in an amendment to this HMMP and the restoration goals will be adjusted accordingly.
- Compensatory mitigation is proposed to be in-kind (i.e., similar habitat conditions to the impacted areas) and located within the PIA to the extent feasible. As of September 2022, the County has determined there is sufficient, suitable space available in the PIA to accomplish this, with the potential exception of mitigation for salt marsh required by CCC.
- Restoration plantings on the northwest and northeast side of the new bridge will accommodate the CCC requirement that the County establish a 5-foot-wide graded bench that would be suitable for future development of a trail. The CCC requires the following modification: “The HMMP proposes to install container plants at precise intervals. This is not how native communities establish. Instead, please take samples and then seek to mimic the relative cover and spacing of the species in the community.” Morro manzanita plantings will be planted in a mosaic pattern with average spacing of approximately 1.5 times the mature crown size of each species to best simulate the natural ecology (approximately 10-15 ft). Reference populations in less

disturbed areas are consistent with this space (State Parks land uphill of Broderson Road).

Proposed mitigation includes:

- 1:1 ratio for restoration of temporary construction impacts;
- 3:1 ratio for permanent impacts to Morro manzanita chaparral;
- 4:1 ratio for replacement of native oak trees greater than 4-inch DBH removed for the project, corresponding to up 100 replacement trees (1.0 acre of land required); and
- Additional 3:1 ratio for restoration of temporary construction impacts to salt marsh and additional 2:1 ratio for mitigation for permanent impacts to Morro Manzanita chaparral to meet the CCC-required mitigation ratios for these resources (4:1 for salt marsh and 3:1 for Morro manzanita chaparral).

This proposed mitigation is detailed in Tables 1a-1c.

***Tidal Areas Strategy.***

- No permanent adverse impacts below the HTL are proposed.
- Beneficial impacts will result from removal of the existing bridge piers from the channel (removal affecting approximately 32 square feet of direct impact area plus surrounding indirect scour effects).
- Field review: Temporary construction impact areas will be revisited prior to construction to ensure correct baseline conditions are documented for restoration purposes (for example, wetland acreage, percent cover and species composition).
- Contractor review: Temporary construction impacts to salt marsh will be minimized to the greatest extent possible based on coordination with the contractor regarding the location of the dewatering features and trestle piles.
- Temporary impacts below the HTL (shown in detail in Figure 3) will be restored to pre-existing contours and vegetative cover. No import or export of fill material is proposed.
- Cofferdam and trestle piles installation and removal is expected to result in minor, localized sediment displacement, which will be carefully smoothed to restore natural contours.
- Salt marsh restoration areas will be revegetated using pickleweed mulch and container plants to restore pre-existing conditions (percent cover, dominant species) as documented during pre-construction baseline surveys. The County conducted a salt marsh restoration pilot project from April to September, 2021, to evaluate the feasibility of restoring pickleweed marsh using cuttings ("mulch"). The pilot project confirmed the ability to establish pickleweed using mulch covered with protective mesh. The County anticipates that use of this approach, supplemented with container plantings of additional marsh species, will result in relatively quick restoration of salt marsh impact areas.
- Spiny rush plants removed during construction will be replaced at a 1:1 ratio in suitable channel-edge locations.
- Salt marsh mitigation areas, up to 0.33 acre, *to be determined*.

***Morro Manzanita Strategy.***

- Impacts to Morro manzanita chaparral and removal of individual plants will be minimized to the greatest extent possible.

- Temporary impacts to 0.6 acre of Morro manzanita chaparral (mitigation area 2 in Figure 4a and Table 3) will be restored to pre-existing contours, soil conditions, and vegetation using with a combination of hydroseeding and container plants. Between this area and other habitat types with individual shrubs, up to 38 individual Morro manzanita plants may be removed for construction access and staging and would be replaced for restoration. The County expects that temporary construction impacts can be configured to avoid most, if not all, impacts to individual Morro manzanita plants, but this will need to be finalized prior to construction.
- Permanent impacts to 0.24 acre of Morro manzanita chaparral and up to 27 individual plants will be mitigated at a 3:1 mitigation ratio, requiring 0.72 acre and approximately 81 individual plants. As required by the CCC, an additional 3:1 mitigation area will be provided as mitigation for temporary impacts (1.8 acres), resulting in a total mitigation acreage of 2.52 acres.
- In addition to the temporary construction impact restoration area (0.6 acre, 2<sup>nd</sup> bullet above, mitigation area 2 in Table 3), mitigation areas for Morro manzanita chaparral could be established in the following areas (listed in Table 3):
  - Iceplant stand temporary construction impact area northeast of the bridge to be restored (area 3; 0.14 acre);
  - Veldt grass stand temporary construction impact area southeast of the bridge to be restored (area 8; 0.68 acre);
  - Southern half of the construction impact area to be restored on the northwest side of South Bay Boulevard (area 4; 0.36 acre);
  - North and south South Bay Boulevard abandoned lane removal areas (areas 5 and 11; 1.2 acres); and
  - Individual plantings in the dune slope and Lompoc ceanothus restoration areas (areas 9 and 10; 0.30 acre).

These areas total 3.27 acres for restoration and mitigation. This indicates that there is sufficient space available in the PIA and adjacent right-of-way to implement the required Morro manzanita chaparral restoration/mitigation of 2.52 acres. The additional area available will help offset small reductions expected to result from drainage swales to be located in several areas (areas 1, 5, 7, 11).

**Oak Woodland.** Removal of oak trees will be minimized to the greatest extent possible. Removal of trees with diameter at breast height (DBH) of 4 inches or more is anticipated to include 9 trees in the permanent impact footprint for the realigned approach roads and additional trees in the temporary construction disturbance area, for a total of 15 to 25 trees. Replacement plantings at a 4:1 replacement ratio would correspond to up to 100 replacement plantings.

Replacement plantings could be planted in the following areas (listed in Table 3):

- Oak woodland temporary construction impact area to be restored, 0.2 acre, (area 7; approximately 10 trees);
- Veldt grass dominated construction staging area to be restored, bordering the east side of South Bay Boulevard north of Turri Road 0.61 acre (area 1; approximately 100 trees; this area could be expanded further north in County right-of-way if necessary, although this area is outside the Project Impact Area evaluated for CEQA and NEPA);
- Northern half of the construction impact area to be restored on the west side of South Bay Boulevard north of the bridge, approximately 0.36 acre (area 4); and



- Iceplant stands southwest of the bridge, 0.1 acre (area 12; approximately 20 trees).

These areas provide sufficient space to plant a total of 180 oak trees. This indicates that there is more than enough space available in the PIA to install the required oak replacement plantings (100 trees).

**Remaining ESHA.** Temporary construction impacts to Lompoc ceanothus chaparral and dune slope (areas 9 and 10, Table 3) will be restored to pre-existing contours and vegetated with container plants and a native seed mix. In accordance with the pre-application CCC recommendations (CCC 2022) individual Lompoc ceanothus and suffrutescent wallflower will be replaced at a 1:1 ratio in suitable vegetation communities as part of the restoration plantings.

**Table 3. Proposed Restoration and Mitigation Areas**

| Area <sup>1</sup> | Existing Conditions                                            | Acreage | Restoration / Mitigation                                                                                               | Details                                                                                                                                                                                       | Success Criteria                                                                                                |
|-------------------|----------------------------------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| 1                 | Veldt grass                                                    | 0.61    | Construction disturbance to be restored and enhanced with oak replacement plantings                                    | Approximately 100 oak plantings; 10-ft setback from pavement for oaks; native seed mix                                                                                                        | Groundcover to prevent erosion; oak survival; <25% non-native species excluding non-native annual grasses       |
| 2                 | Morro manzanita chaparral                                      | 0.61    | Construction disturbance to be restored to Morro manzanita chaparral                                                   | Establish approximately 20 MM plants (transplants or seedlings); plus additional plantings to mimic pre-existing community; plus native seed mix                                              | Groundcover to prevent erosion; MM survival; <5% non-native species excluding non-native annual grasses         |
| 3                 | Iceplant stands                                                | 0.14    | Construction disturbance to be restored and enhanced with Morro manzanita chaparral                                    | Establish approximately 3 MM plants (transplants or seedlings); plus additional plantings to mimic adjacent, pre-existing MM community; plus native seed mix                                  | Groundcover to prevent erosion; MM survival; <5% non-native species excluding non-native annual grasses         |
| 4                 | Coyote brush scrub with approximately 8 Morro manzanita shrubs | 0.72    | Construction disturbance to be restored and enhanced with 0.36 acre MM chaparral and 0.36 acre oak plantings           | MM southern half (10); oaks northern half; plus additional plantings to mimic pre-existing MM and oak woodland habitats in PIA; coyote brush container stock; native seed mix; drainage swale | Groundcover to prevent erosion; MM and oak survival; <5% non-native species excluding non-native annual grasses |
| 5                 | Pavement                                                       | 0.49    | Pavement removal area to be restored to Morro manzanita chaparral, and north end available for oak plantings if needed | MM southern portion (10); oaks northern portion; plus additional plantings to mimic pre-existing MM and oak woodland habitats in PIA; coyote brush container stock; native seed mix           | Groundcover to prevent erosion; MM and oak survival; <5% non-native species excluding non-native annual grasses |
| 6                 | Salt marsh                                                     | 0.11    | Construction disturbance to be restored to salt marsh                                                                  | Pickleweed cuttings; container plants to mimic pre-existing salt marsh community                                                                                                              | Native survival/cover to meet or exceed baseline; <5% non-native species                                        |

|    |                                      |      |                                                                                         |                                                                                                                                                                                                                   |                                                                                                                 |
|----|--------------------------------------|------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| 7  | Oak woodland                         | 0.20 | Construction disturbance to be restored to oak woodland                                 | Approximately 10 oak plantings, plus additional plantings to mimic pre-existing community, native seed mix, 10-ft setback from pavement for oaks; new road berm may limit plantable area for oaks; drainage swale | Groundcover to prevent erosion; oak survival; <5% non-native species excluding non-native annual grasses        |
| 8  | Veldt grass                          | 0.68 | Construction disturbance to be restored and enhanced to Morro manzanita chaparral       | Approximately 15 MM plants; plus additional plantings to mimic pre-existing community, native seed mix                                                                                                            | Groundcover to prevent erosion; MM survival; <5% non-native species excluding non-native annual grasses         |
| 9  | Dune Slope (2 areas)                 | 0.1  | Construction disturbance to be restored and available for oak or MM plantings if needed | Native seed mix; container plants to mimic pre-existing community; available if needed for MM, oaks, or Lompoc ceanothus                                                                                          | Groundcover to prevent erosion; MM survival; <5% non-native species excluding non-native annual grasses         |
| 10 | Lompoc ceanothus chaparral (2 areas) | 0.08 | Construction disturbance to be restored and available for oak or MM plantings if needed | Lompoc ceanothus container plants, plus additional plants to mimic pre-existing community; native seed mix                                                                                                        | Groundcover to prevent erosion; MM survival; <5% non-native species excluding non-native annual grasses         |
| 11 | Pavement                             | 0.71 | Pavement removal area to be restored to Morro manzanita chaparral                       | Approximately 15 MM; plus additional plants to mimic pre-existing community; native seed mix                                                                                                                      | Groundcover to prevent erosion; MM and oak survival; <5% non-native species excluding non-native annual grasses |
| 12 | Iceplant stands                      | 0.10 | Construction disturbance to be restored and enhanced for oak tree replacement           | Approximately 20 oak plantings; plus additional plants to mimic pre-existing community; native seed mix.                                                                                                          | Groundcover to prevent erosion; oak survival; <5% non-native species excluding non-native annual grasses        |

1 – Refer to Figures 4a and 4b for locations; area 6 is shown in Figure 3.

## **4.2 Target Functions and Values**

The goal of the HMMP is to restore and enhance the diverse and valuable biological and aquatic resources within the project area after the project is completed. An increase in functions and values on site is expected as a result of the project because:

- Permanent impacts have been reduced to relatively small areas given the overall scope of the project;
- No adverse permanent impacts to estuarine habitats are proposed and incremental improvement will be accomplished with removal of the existing bridge piers from the channel;
- Temporary impacts to estuarine habitats will be of short duration (five months) and divided between two construction seasons;
- Temporary construction impacts to valuable habitat areas will be restored;
- Removal of abandoned road sections provides the opportunity to mitigate for permanently impacted habitats; and
- Some lower-value habitats will be enhanced as part of the proposed mitigation for permanent impacts.



Figure 4a. Proposed Restoration and Mitigation Areas

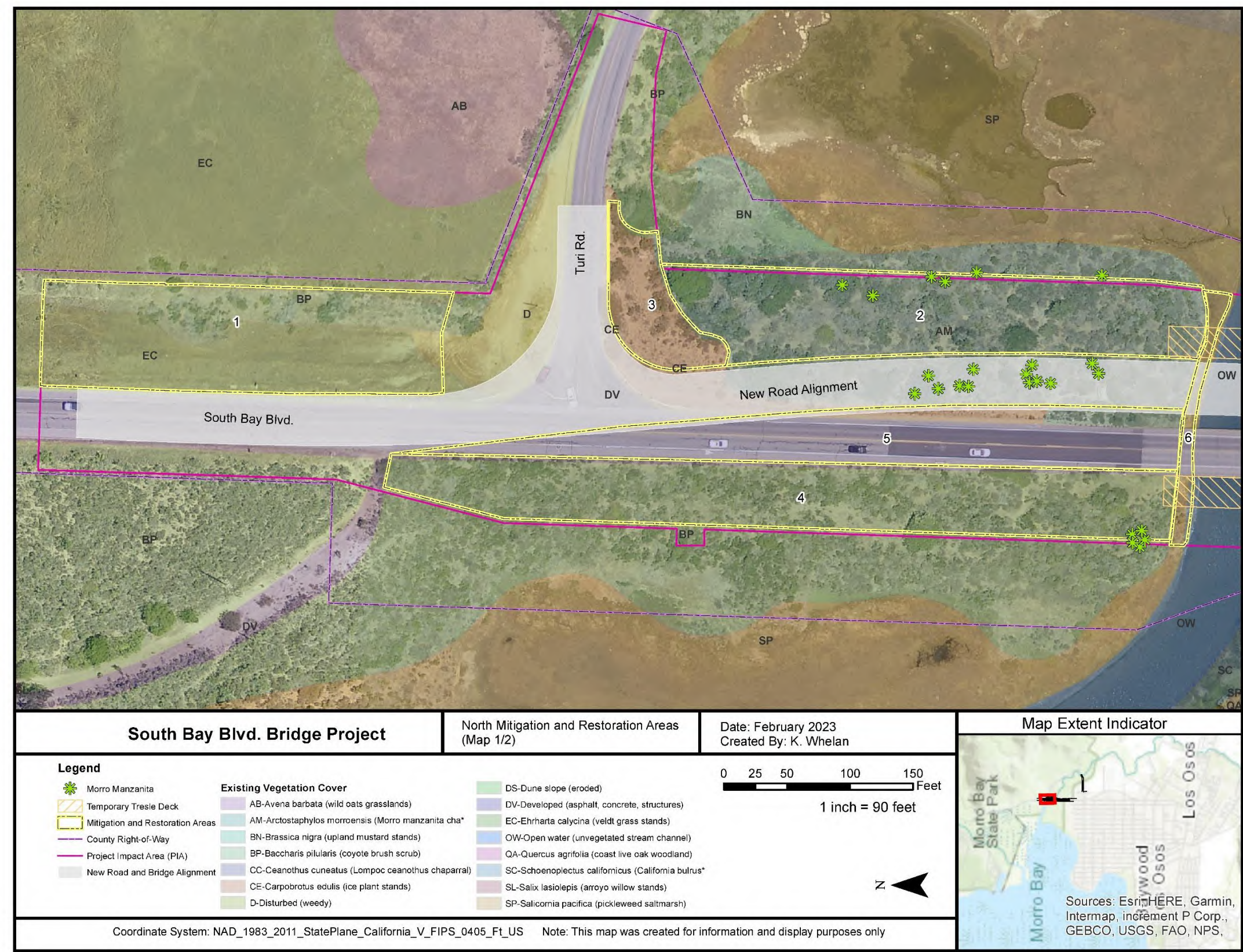
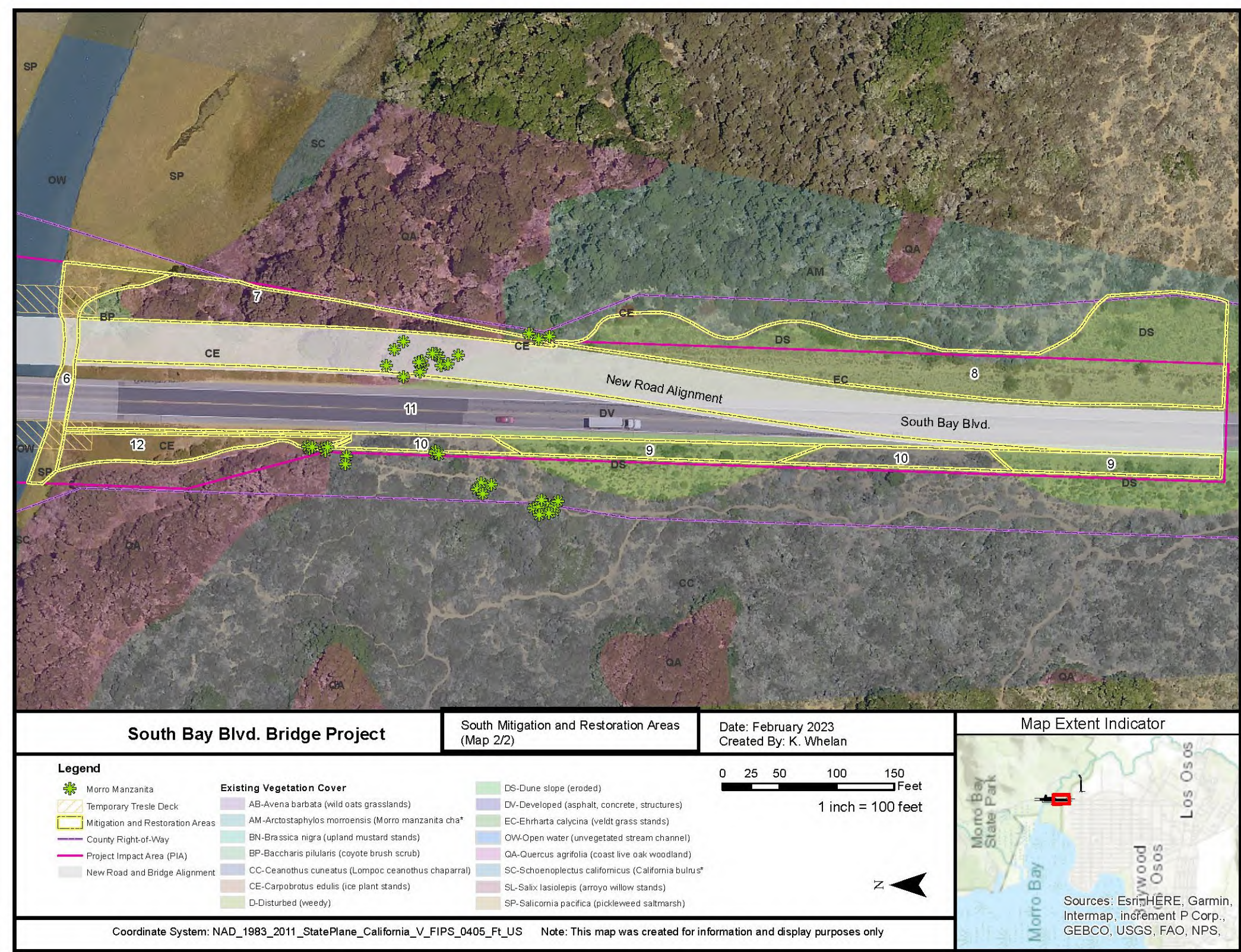




Figure 4b. Proposed Restoration and Mitigation Areas





### **4.3 Time Lapse between Impacts and Expected Compensatory Mitigation Success**

Construction is expected to take two seasons, one for construction of the new bridge and one for demolition of the existing bridge. Some of the temporary impact areas may be required for construction staging for both construction periods. The South Bay Boulevard road removal areas will likely not be available until the end of the second construction season.

Temporary construction impacts in jurisdictional areas are expected to be in place in individual shoreline locations for a single construction season for a duration of five months:

- Construction Season 1: east work trestle and dewatering areas for bridge construction
- Construction Season 2: west work trestle and dewatering areas for bridge demolition

Season 1 structures are expected to be removed and the impacted areas restored at the end of Season 1, although it may be necessary to leave the work trestle in place. This will be avoided to the extent feasible. All structures are expected to be removed and the impacted areas restored following completion of the second construction season.

Upland temporary construction impacts are anticipated to be in place for two construction seasons. It may be possible to restore some of the temporary impact areas following completion of Season 1. This will be determined in coordination with the contractor based on access and staging needs for Season 2. Restoration of temporary impacts to Morro manzanita chaparral will be the first priority for post-Season 1 restoration, if feasible. Otherwise, it is anticipated that restoration and mitigation for upland impact areas would occur following completion of the project.

Hydroseeding, transplants, and container stock associated with restoration and mitigation efforts will be installed in the late fall/early winter after completion of construction activities, when the plant materials installed will have the greatest chance of becoming established because they will receive natural rainfall during the cooler portion of the year.

The County expects restoration of temporarily disturbed salt marsh habitat to be restored more quickly; a preliminary estimate is within one or two years following restoration activities. Table 5 provides a typical implementation, maintenance, and monitoring schedule for County projects. The schedule will be complicated for this project because there will be two construction seasons, and some of the restoration may be accomplished at the end of Season 1, with the remainder following Season 2. Two construction seasons results in a total monitoring duration of seven years from construction start.

The proposal to remove, store, and transplant Morro manzanita plants, if feasible, and the use of container stock being generated for the project in the County's greenhouse, will jump-start the functions and values of the oak and Morro manzanita mitigation areas considerably compared to the alternative of using seeds/acorns on site. The County expects to have sufficient container stock generated in the greenhouse to avoid the need to use seed/acorns for restoration. The County will target attaining container stock of sufficient size to minimize predation losses. Feasibility of transplanting Morro manzanita plants will likely be limited to smaller shrubs, and the methods/approach will need to be developed in a pilot project prior to construction. These approaches are expected to result in shortened timeframes between restoration work and compensatory mitigation success.

**Table 4. Typical Mitigation and Monitoring Schedule**

| <b>Year 1 Bridge Construction and Year 2 Demolition</b> | <b>JAN</b> | <b>FEB</b> | <b>MAR</b> | <b>APR</b> | <b>MAY</b> | <b>JUN</b> | <b>JUL</b> | <b>AUG</b> | <b>SEP</b> | <b>OCT</b> | <b>NOV</b> | <b>DEC</b> |
|---------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Construction Monitoring                                 |            |            |            |            |            | X          | X          | X          | X          | X          |            |            |
| Prepare Planting Areas                                  |            |            |            |            |            |            |            |            |            | X          |            |            |
| Install and Water Plantings                             |            |            |            |            |            |            |            |            |            |            | X          |            |
| Site/Revegetation Monitoring                            |            |            |            |            |            |            |            |            |            | X          | X          | X          |
| <b>Year 3 - Monitoring Year 1</b>                       | <b>JAN</b> | <b>FEB</b> | <b>MAR</b> | <b>APR</b> | <b>MAY</b> | <b>JUN</b> | <b>JUL</b> | <b>AUG</b> | <b>SEP</b> | <b>OCT</b> | <b>NOV</b> | <b>DEC</b> |
| Weeding/Maintenance                                     | X          |            | X          |            |            | X          |            | X          |            |            | X          |            |
| General Site Monitoring                                 |            |            | X          |            |            | X          |            |            |            | X          |            | X          |
| Biological Data Collection                              |            |            | X          |            |            |            |            |            |            | X          |            |            |
| Annual Report                                           |            |            |            |            |            |            |            |            |            |            |            | X          |
| <b>Year 4 - Monitoring Year 2</b>                       | <b>JAN</b> | <b>FEB</b> | <b>MAR</b> | <b>APR</b> | <b>MAY</b> | <b>JUN</b> | <b>JUL</b> | <b>AUG</b> | <b>SEP</b> | <b>OCT</b> | <b>NOV</b> | <b>DEC</b> |
| Weeding/Maintenance                                     |            | X          |            | X          |            | X          |            | X          |            |            | X          |            |
| General Site Monitoring                                 |            |            |            | X          |            | X          |            |            |            | X          |            | X          |
| Biological Data Collection                              |            |            |            | X          |            |            |            |            |            | X          |            |            |
| Annual Report                                           |            |            |            |            |            |            |            |            |            |            |            | X          |
| <b>Year 5 - Monitoring Year 3</b>                       | <b>JAN</b> | <b>FEB</b> | <b>MAR</b> | <b>APR</b> | <b>MAY</b> | <b>JUN</b> | <b>JUL</b> | <b>AUG</b> | <b>SEP</b> | <b>OCT</b> | <b>NOV</b> | <b>DEC</b> |
| Weeding/Maintenance                                     |            | X          |            | X          |            | X          |            | X          |            | X          |            |            |
| General Site Monitoring                                 |            |            |            | X          |            |            |            |            |            | X          |            |            |
| Biological Data Collection                              |            |            |            | X          |            |            |            |            |            | X          |            |            |
| Annual Report                                           |            |            |            |            |            |            |            |            |            |            |            | X          |
| <b>Year 6 - Monitoring Year 4</b>                       | <b>JAN</b> | <b>FEB</b> | <b>MAR</b> | <b>APR</b> | <b>MAY</b> | <b>JUN</b> | <b>JUL</b> | <b>AUG</b> | <b>SEP</b> | <b>OCT</b> | <b>NOV</b> | <b>DEC</b> |
| General Site Monitoring                                 |            |            |            | X          |            |            |            |            |            | X          |            | X          |
| Biological Data Collection                              |            |            |            | X          |            |            |            |            |            | X          |            |            |
| Annual Report                                           |            |            |            |            |            |            |            |            |            |            |            | X          |
| <b>Year 7 - Monitoring Year 5</b>                       | <b>JAN</b> | <b>FEB</b> | <b>MAR</b> | <b>APR</b> | <b>MAY</b> | <b>JUN</b> | <b>JUL</b> | <b>AUG</b> | <b>SEP</b> | <b>OCT</b> | <b>NOV</b> | <b>DEC</b> |
| General Site Monitoring                                 |            |            |            | X          |            |            |            |            |            | X          |            | X          |
| Biological Data Collection                              |            |            |            | X          |            |            |            |            |            | X          |            |            |
| Completion Report                                       |            |            |            |            |            |            |            |            |            |            |            | X          |

## 5 Mitigation Implementation Plan

This section describes how the required mitigation for the project will be conducted and includes the specific methodologies and plant species that will be used.

Implementation of the restoration and mitigation activities will be conducted or overseen by a County-approved restoration specialist that has the necessary experience and skills to complete the required mitigation for the project. The restoration specialist will ensure conformity of all the mitigation activities with this HMMP.

Only native, non-invasive species will be used for restoration and mitigation efforts. No plant species listed as problematic and/or invasive by the California Native Plant Society, the California Exotic Pest Council, or by the State of California will be used in restoration and mitigation sites. No plant species listed as a noxious weed by the State of California or the U.S. Federal Government will be used.

Suitable erosion and sedimentation control measures will be maintained on site until plant cover is sufficiently dense to protect the soil from erosion. Measures could include, for example, use of weed-free straw wattles, silt fence, jute netting, and sand or gravel bags. All measures used will be biodegradable; measures incorporating plastic mesh will not be allowed.

All proposed restoration and mitigation areas are in County right-of-way. No temporary construction easements (TCE) are anticipated to be required. In the event TCE's are required, it would most likely be with State Parks, which owns most of the adjoining land.

### 5.1 Site Preparation

The restoration and mitigation activities will be initiated when construction is finished and prior to the onset of the winter rainy season. Restoring pre-existing substrate conditions and grades, installing necessary sedimentation and erosion controls, and hydroseeding disturbed areas will generally be part of the construction contract to be implemented by the contractor. Hydroseeding in specific habitat restoration areas may be accomplished separately by the County.

#### 5.1.1 Temporary Impact Restoration Areas

**Tidal Areas.** Site preparation in tidal restoration areas will include removing all construction materials (cofferdams, trestle piles) and smoothing any displaced sediment in unvegetated areas to restore pre-existing conditions. No import or export of fill material is proposed. Any displaced sediment in the channel that results from installation and removal of the cofferdams and trestle piles is expected to be of minimal quantity and localized to the immediate vicinity of the structures.

**Non-Tidal Areas.** Temporary construction impacts to ESHA will be restored to pre-existing conditions. Temporary impacts to non-ESHA will be enhanced to higher-value habitats in most locations (e.g., Morro manzanita chaparral and oak plantings). Site preparation in non-tidal areas will include removing all construction-related materials and debris and restoring pre-existing contours and hydroseeding. Soils will be stabilized with suitable measures (e.g., weed-free straw wattles, jute netting) on or adjacent to slopes.

In accordance with CCC requirements, restoration plant communities will mimic pre-existing communities (dominant species, relative cover, and spacing) for Morro manzanita chaparral, oak woodland, Lompoc ceanothus chaparral, and coyote brush scrub. Container stock will be planted in a mosaic pattern with average spacing of approximately 1.5 times the mature crown size of each species to best simulate the natural ecology (approximately 10-15 ft for Morro Manzanitas and Lompoc Ceanothus). Duplicate plantings or closer spacing may be used in anticipation of relatively high mortality rates of manzanita transplants and number of available nursery stock. Reference populations in less disturbed areas are consistent with this space (State Parks land uphill of Broderson Road).

Seed mixes to establish the ESHA community habitat conditions provided in Section 4.1 for the restoration areas listed in Table 3 would be derived from the following:

Morro Manzanita Chaparral: yarrow (*Achillea millefolium*), coyote brush, black sage, California sagebrush, coastal golden yarrow (*Eriophyllum staechadifolium*), deerweed, dune bush lupine (*Lupinus chamissonis*), and mock heather (*Ericameria ericoides*).

Coyote Brush Scrub: yarrow, coyote brush, black sage, California sagebrush, coastal golden yarrow, deerweed, dune bush lupine, and mock heather.

Lompoc Ceanothus Chaparral: yarrow, coyote brush, black sage, California sagebrush, coastal golden yarrow, deerweed, dune bush lupine, and mock heather.

Eroded Dune Slope: coyote brush, Coastal golden yarrow, coast goldenbush (*Isocoma menziesii*), mugwort (*Artemisia douglasiana*), California croton, deerweed, and mock heather.

Coast Live Oak Woodland: yarrow, coyote brush, black sage, California sagebrush, coastal golden yarrow, deerweed, dune bush lupine, and mock heather (*Ericameria ericoides*).

Stormwater drainage swales: seeding/planting will be consistent with an approved plant list provided in the Central California Coast Low Impact Development Bioretention Guidance Technical Assistance Memo (Central Coast LIDI 2011). This document lists species to be selected from for the bottom of swales (e.g., California gray rush (*Juncus patens*), clustered field sedge (*Carex praegracilis*), deer grass (*Muhlenbergia rigens*), common yarrow, and yerba mansa (*Anemopsis californica*)) and sideslopes (e.g., coast live oak, coyote brush, Pacific blackberry (*Rubus ursinus*), toyon (*Heteromeles arbutifolia*), coffeeberry (*Rhamnus californica*), wax myrtle (*Morella californica*), California poppy (*Eschscholzia californica*), and sky lupine (*Lupinus nanus*)). Any of the plants selected from the approved plant list will be compatible with the mitigation efforts.

Additional site preparation details for Morro manzanita chaparral will include ensuring appropriate soil conditions. Potential strategies to facilitate restoration after construction may include protecting the native soil in situ or removing and storing it to be used in site restoration. For the 0.6-acre construction impact area, topsoil could potentially range from 1,000 to 2,000 cubic yards (based on 1- to 2-foot depth). As a general approximation, roughly 0.5 acre may be needed for storage. The most feasible and cost-effective approach will need to be determined.

Imported soil is not expected to be needed for restoration. However, if it is, soil specifications will be developed to ensure that the restoration area has suitable substrate to maximize Morro manzanita restoration success (e.g., beach sand or sandy loam).

To accommodate a future coastal trail as required by CCC, shrub and oak trees will not be planted in the 5-foot-wide graded bench proposed to connect the northwest side of the new bridge, with an undercrossing under the bridge, and a portion of the restoration area on the northeast side of the new bridge. A preliminary estimate is that this area would include up to approximately 3,500 s.f. (0.08 acre) of the restoration areas. Shrubs and trees planted in the trail alignment would have to be removed for development of the trail in the future, so these areas will be seeded with a native seed mix. The proposed trail alignment areas will not mimic the random plant arrangement required by CCC, but a 5-foot gap between plantings is smaller than the anticipated spacing between shrubs so is not expected to have adverse effects on habitat value.

### 5.1.2 Permanent Impact Mitigation Areas

**Tidal Areas.** No permanent impacts to tidal areas are required.

**Non-Tidal Areas.** Site preparation in non-tidal mitigation areas includes Morro manzanita chaparral and oak woodland.

**Morro manzanita chaparral:** In addition to use of lower-value construction impact areas described in Section 5.1.1, the proposed mitigation areas for Morro manzanita chaparral include



road removal areas. Site preparation will include removal of existing pavement and road base materials. Compacted soils would be disked. If necessary to establish desirable grades, weed-free soil suitable for the targeted habitat type would be placed.

The feasibility of removing and storing the native topsoil from the permanent impact area (as described for the temporary construction impact area above) may be considered. An estimated 400 to 800 cubic yards of topsoil may be available from the 0.24-acre permanent impact area. In the event soil for the mitigation area must be imported from offsite, specifications for suitable soil will be developed (e.g., beach sand or sandy loam).

The Morro manzanita mitigation areas will be vegetated with suitable container stock and seeded with the same mix described for the Morro manzanita restoration area in Section 5.1.1.

**Oak Woodland:** In addition to the use of lower-value construction impact areas described in Section 5.1.1, the proposed oak woodland mitigation and additional oak tree replacement planting areas may include road removal areas. Site preparation will include removal of existing pavement and road base materials. Compacted soils would be disked. If necessary to establish desirable grades, weed-free soil suitable for the targeted habitat type would be placed. The oak woodland mitigation area will be vegetated with suitable container stock and seeded with the same seed mix described for the oak woodland restoration area in Section 5.1.1.

## **5.2 Plantings**

### **5.2.1 Tidal Areas**

Areas where pickleweed has been removed by construction activities will be restored by mulching with pickleweed cuttings to restore vegetative cover that is comparable to the pre-existing salt marsh vegetation. Pickleweed mulching has been documented as a reliable way to re-establish cover and may be applied from fall through spring as a way to establish pickleweed cover and reduce invasive species colonization (Miles et. al. 2015).

It is anticipated that there are sufficient pickleweed stands in the project vicinity to obtain cuttings. The proposed approach consists of obtaining cut pieces about 20 cm long that will be placed by hand in restoration areas and covered with anchored jute mesh for protection. Details may be refined through agency coordination as part of the permit application process.

The need for container plantings to re-establish additional species will be based on the results of the pre-construction baseline surveys of the marsh areas to be impacted and the success of pickleweed mulching. Additional plantings may be included in the restoration design. This could include, for example, jaumea and saltgrass plantings from nursery stock.

### **5.2.2 Non-Tidal Areas**

For all non-tidal restoration and mitigation areas, the target species included in the proposed hydroseed mixes could be supplemented with container stock if deemed necessary (e.g., coyote brush). Because of the aerial extent of areas to be treated, hydroseeding will be relied upon as the initial/primary method.

Morro manzanita plantings are proposed to include the plants generated in the County greenhouse, and may also include plants in the construction disturbance zone that would be removed and set aside for the duration of construction, if feasible. Additional plants would be obtained from nursery stock if necessary. Some of the plants on site will likely be too large to remove and store for transplanting. Smaller plants in the project impact areas may be removed and set aside for replanting in restoration and mitigation areas. The County is coordinating with State Parks and the U.S. Fish and Wildlife Service for their expertise regarding the removal methods, storage, maintenance, and transplanting of the plants. Details will be refined through continued coordination and the permit application process. Plants could be stored in County right-of-way at the site, State Parks greenhouse facilities or lands, and/or the County greenhouse

facility at Kansas Avenue in San Luis Obispo. Storage would likely be in containers, although the feasibility of installing temporary containment ditches may be considered. Plants would be watered and protected from damage for the duration of construction.

Morro manzanita seedlings will be used to attain the necessary quantity of replacement plants. Seedlings may be obtained from commercial nurseries and/or propagated for the project. The County currently has approximately 35 seedlings obtained from a local nursery that are intended to be used for the project and additional container stock is being generated by the County using seed propagation and cuttings collected at the project site or other locations in Los Osos. Propagation efforts are being coordinated with the USFWS.

Coast live oak seedlings will be propagated by the County using acorns collected in the project vicinity and/or purchased from nursery stock.

Lompoc ceanothus plantings will be from County greenhouse or nursery stock.

### **5.3 Planting Methodology**

#### **5.3.1 Installation of Container Stock**

Container stock plantings will be installed by hand in accordance with the following general guidelines:

- Container stock will generally be planted in clusters and with spacing to match the impact areas;
- Morro manzanita will be planted in a mosaic pattern with average spacing of 1.5 times the mature crown size (approximately 10 to 15 ft);
- Duplicate plantings or closer spacing may be used in anticipation of relatively high mortality rates of manzanita transplants and number of available nursery stock;
- Prior to planting container stock, an area approximately two feet in diameter at each proposed planting location will be manually cleared of any non-native, invasive plant species.
- Once the area is cleared of non-natives, a planting hole will be excavated.
- All planting holes will be excavated to equal the depth and approximately 1.5 times the width of the root-ball or rhizome.
- Each plant will be installed in the center of the hole and subsequently backfilled with the native soil material removed to create the hole. Attention will be given not to disturb rhizomes when planting.

Details pertaining to transplanting Morro manzanita plants and installing seedlings may be refined based on coordination with the regulatory agencies.

#### **5.3.2 Soil Stabilization and Seeding**

Bare soil resulting from installation of container plants will be reseeded and stabilized with erosion control devices if necessary. Suitable erosion and sedimentation control measures will be maintained on site until plant cover is sufficiently dense to protect the soil from erosion.

## **6 Maintenance Plan**

Maintenance during plant establishment is necessary to ensure success of the mitigation efforts. The five-year maintenance period will begin immediately after completion of the mitigation plantings. At the end of the maintenance period, the appropriate regulatory resource agencies will review the monitoring reports submitted, evaluate whether the performance standards have been achieved, and determine whether the maintenance period will be ended or extended. The maintenance program will ensure that watering of installed plants, weed abatement, trash removal, vandalism, replanting, plant protection, and general site safeguarding are performed adequately and at appropriate frequencies.

## 6.1 Watering

Supplemental water will be applied to the restoration plantings via a water truck. Installation of irrigation systems that use on-site water storage tanks may be proposed.

## 6.2 Weed Abatement

The USFWS BO (under Proposed Mitigation, page 4) requires weed abatement using hand removal methods in the restoration areas for five years.

The USFWS BO also requires implementation of the mitigation measures on pages 7 through 12 of the USFWS/Caltrans Programmatic BO (PBO) for CRLF. Condition 18 of the PBO addresses use of herbicides, including the following:

a. Caltrans will not use herbicides during the breeding season for the California red- legged frog [NOTE: the CRLF breeding season is November through May];

b. Caltrans will conduct surveys for the California red-legged frog immediately prior to the start of any herbicide use. If found, California red-legged frogs will be relocated to suitable habitat far enough from the project area that no direct contact with herbicides would occur;

c. Giant reed and other invasive plants will be cut and hauled out by hand and painted with glyphosate or glyphosate-based products, such as Aquamaster® or Rodeo®;

d. Licensed and experienced Caltrans staff or a licensed and experienced contractor will use a hand-held sprayer for foliar application of Aquamaster® or Rodeo® where large monoculture stands occur at an individual project site;

e. All precautions will be taken to ensure that no herbicide is applied to native vegetation.

f. Herbicides will not be applied on or near open water surfaces (no closer than 60 feet from open water) [NOTE: Figure 5 shows 60-foot setback from HTL].

g. Foliar applications of herbicide will not occur when wind speeds are in excess of 3 miles per hour.

h. No herbicides will be applied within 24 hours of forecasted rain.

i. Application of all herbicides will be done by a qualified Caltrans staff or contractors to ensure that overspray is minimized, that all application is made in accordance with label recommendations, and with implementation of all required and reasonable safety measures. A safe dye will be added to the mixture to visually denote treated sites. Application of herbicides will be consistent with the U.S. Environmental Protection Agency's Office of Pesticide Programs, Endangered Species Protection Program county bulletins.

j. All herbicides, fuels, lubricants, and equipment will be stored, poured, or refilled at least 60 feet from riparian habitat or water bodies in a location where a spill would not drain directly toward aquatic habitat. Caltrans will ensure that contamination of habitat does not occur during such operations. Prior to the onset of work, Caltrans will ensure that a plan is in place for a prompt and effective response to accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

The County will continue coordinating with USFWS regarding the following:

- a) Whether aquatic-approved herbicides that are included in the RWQCB Aquatic Use General Permit may be used within the 60-foot setback from open water;

- b) Whether the CRLF PBO restriction on use of herbicides during the CRLF breeding season applies to the entire project area, including aquatic and non-aquatic areas, given that suitable conditions for CRLF breeding have not been documented in the project area and documented breeding locations are generally on the order of 1 to 2 miles from the PIA; and
- c) Because PBO Condition 18.c specifically mentions use of glyphosate or glyphosate-based products, whether Arrow 2EC and/or other non-aquatic approved herbicides, can be used outside the 60-foot aquatic setback area.

Resolution regarding these constraints is still pending. Any changes in the allowable use of herbicides based on coordination with the regulatory agencies will be documented in this HMMP. A final HMMP will be provided to all regulatory agencies prior to construction.

### **6.3 Trash Removal**

Any trash that is present within the mitigation areas will be removed as necessary during the regularly scheduled monitoring/maintenance visits. Trash is not expected to be a significant issue for these mitigation efforts because of the rural location of the project site.

### **6.4 Vandalism**

Vandalism of the mitigation sites is not expected because of the rural nature of the project site. Should any of the restoration plantings be vandalized in a manner that has potential to compromise the success of the mitigation efforts, those factors will be rectified as soon as possible, and replacement plantings will be installed as needed.

### **6.5 Remedial Plantings**

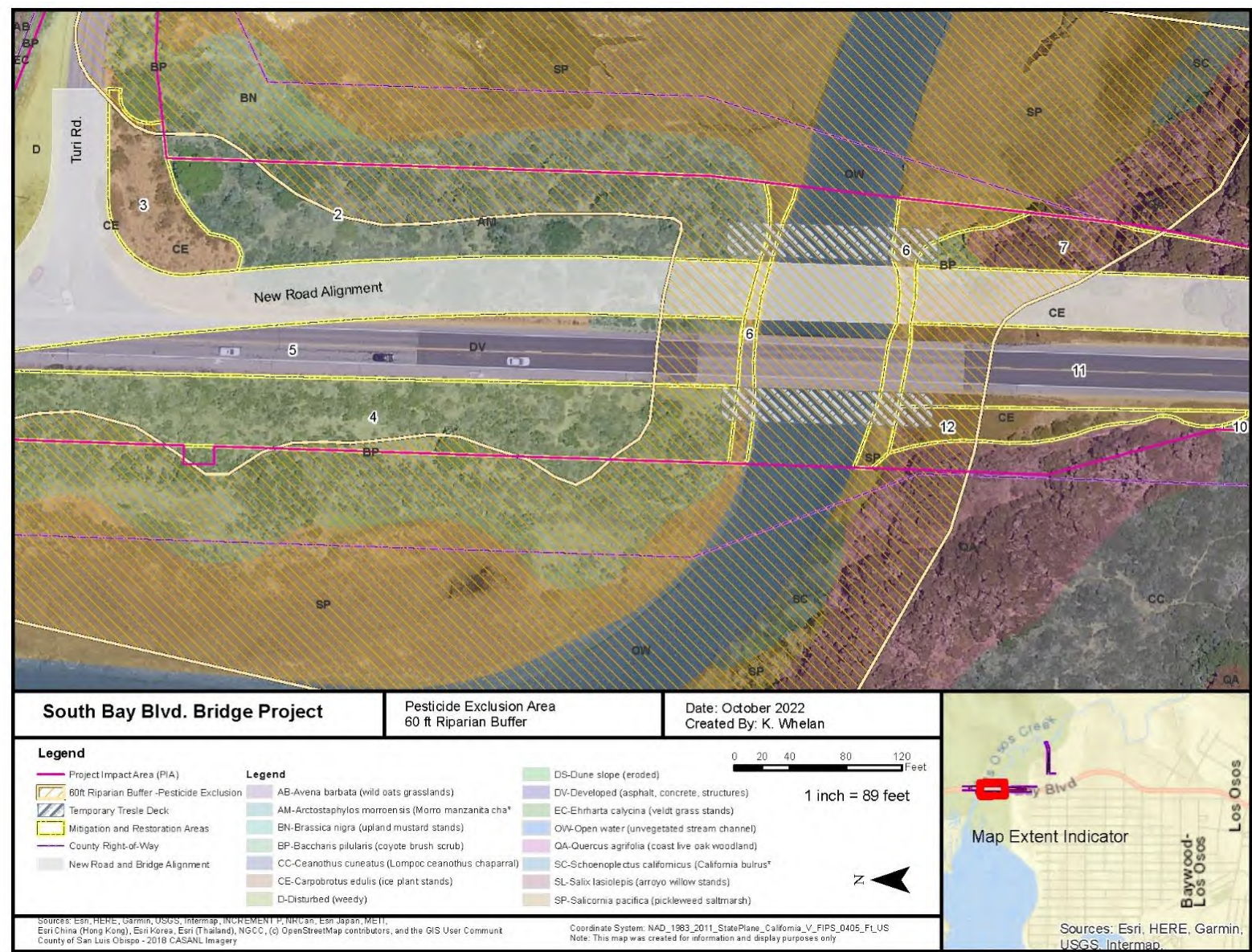
A limited amount of mortality is expected and inherent to any mitigation activity. Remedial plantings to replace installed plantings will be performed as necessary to remain in compliance with the mitigation plan and on a trajectory to accomplish the targeted success goals/criteria. Any such plantings will be performed per the methodologies described in Section 5.3 and will be consistent with the other parameters outlined in this HMMP.

### **6.6 Fertilizing**

For initial plantings, compost and slow-release fertilizer may be used for certain container plants to bolster establishment.



Figure 5. Sixty-foot setback from the high tide line for restricting use of herbicides in open water.





## 7 Monitoring Plan

The goals of the monitoring plan are to:

- Ensure project restoration and mitigation goals and objectives are being met;
- Document compliance using qualitative data regarding percent cover/substrate conditions, percent native / non-native species, and habitat conditions;
- Document compliance using quantitative data regarding Morro manzanita and oak tree survival rates;
- Identify the need for remedial mitigation, augmentative measures, or adaptive management strategies.

The project restoration specialist and/or a County Environmental Resource Specialist will perform the monitoring activities and will collect and evaluate monitoring data. Through this process, the relationship between the actual site conditions and the success criteria will be identified. After the field monitoring and vegetative sampling is complete, the results will be summarized in brief annual monitoring reports that will include photo-documentation and a comprehensive evaluation of the overall success of the mitigation efforts based on whether or not the performance goals for that year were met. Remedial measures to augment or rectify any problematic issues identified on site will also be included, if determined to be needed.

### 7.1 Monitoring Schedule

The monitoring program will consist of general monitoring and maintenance site visits and annual data collection visits. The focus of general monitoring is to assess the plantings overall health, vigor, and status and to determine the need for supplemental water, weeding, mulching, and other maintenance-related issues. The focus of the vegetative monitoring visits is to collect the qualitative and quantitative data that will inform a more comprehensive assessment of compliance with the proposed success criteria.

The County will conduct the monitoring surveys at the project site (at least once per year) for a minimum of five consecutive years as a part of standard mitigation reporting requirements. Surveys will include representative photo documentation. The restoration specialist will typically monitor the site quarterly during the first three years after planting and semiannually for the fourth and fifth years of the monitoring program. The site may also be monitored after large storm events to identify any damage and erosion. The restoration specialist will ensure that the project is maintained as necessary during the entire monitoring period.

The CCC suggested that live oak trees and Morro manzanita shrubs are slow-growing species and may warrant a longer monitoring period to ensure restoration success. The County will evaluate the condition of restoration areas during the 5<sup>th</sup> monitoring period, including size and condition of plants, and will coordinate with the CCC staff on whether additional monitoring years are needed,

### 7.2 Performance Goals

Tables 6a through 6d provide the annual performance standards and final success criteria for the restoration and mitigation efforts. The criteria assume that herbicides will be used to control non-native, invasive species, which are prevalent in the project area. The target goals also exclude non-native grasses such as veldt grass, which already occur in broad portions of the project site and adjoining parcels.

In the event herbicide use is prohibited due to proximity to estuarine waters, control of invasive species will be even more challenging and the performance standards may need to be adjusted.

As described in the NES, the pickleweed salt marsh consists primarily of native species. Performance standards for percent cover and percent native species will be developed based on pre-construction baseline conditions and based on coordination with the regulatory agencies.

The mitigation areas will be monitored annually for five years, or longer if necessary, until the final success criteria are accomplished. Annual monitoring results will be used to gauge progress toward achievement of the final success criteria, and to implement appropriate corrective and contingency measures so that success will be achieved. By the third year post-implementation, the mitigation sites are anticipated to be well established and predominantly self-sustaining, so that supplemental watering is no longer required.

The mitigation sites will not be considered successful until the involved regulatory agencies provide written verification that the final success criteria have been met.

**Table 5a. Final Success Criteria for Salt Marsh**

| Attribute                  | Criteria                                                                                      |
|----------------------------|-----------------------------------------------------------------------------------------------|
| Total percent cover        | to be determined based on baseline conditions; likely $\geq 75\%$ based on current conditions |
| Total percent native cover | $\geq 95\%$                                                                                   |
| Species richness           | $> 50\%$ planted species                                                                      |

**Table 5b. Final Success Criteria for Morro Manzanita Chaparral**

| Attribute                                              | Criteria                 |
|--------------------------------------------------------|--------------------------|
| Total percent cover                                    | $\geq 75\%$              |
| Morro manzanita transplant and seedling survival       | $\geq 75\%$              |
| Invasive species cover exclusive of non-native grasses | $\leq 5\%$               |
| Species richness                                       | $> 50\%$ planted species |

**Table 5c. Final Success Criteria for Oak Woodland**

| Attribute                                                           | Criteria    |
|---------------------------------------------------------------------|-------------|
| Total percent cover                                                 | $\geq 75\%$ |
| Oak planting survival                                               | $\geq 75\%$ |
| Invasive species cover exclusive of non-native grasses <sup>1</sup> | $\leq 5\%$  |
| Species richness                                                    | NA          |

<sup>1</sup> – Excluding oak planting area bordering South Bay Boulevard north of Turri Road (restoration area 1), where success criteria will be 25%.

**Table 5d. Final Success Criteria for Coyote Brush Scrub, Lompoc Ceanothus, and Dune Slope**

| Attribute                                              | Criteria                 |
|--------------------------------------------------------|--------------------------|
| Total percent cover                                    | $\geq 75\%$              |
| Lompoc ceanothus plant survival                        | $\geq 75\%$              |
| Invasive species cover exclusive of non-native grasses | $\leq 5\%$               |
| Species richness                                       | $> 50\%$ planted species |

### 7.3 Other Attributes to be Monitored

The presence of other native volunteer plant species within the mitigation sites indicates that the site conditions are suitable for development of a healthy and self-sustaining natural habitat. Newly

established non-native, weedy plant species observed during monitoring will be removed immediately, so that they do not disperse seed and proliferate. The presence of newly occurring non-native plant species will be observed during the monitoring activities and noted; so that an appropriate course of action can be put into effect.

Wildlife species observed in and around the mitigation areas will be documented along with evidence of the functional use of habitat (i.e., feeding, nesting, roosting, etc.).

Photo points will be established throughout the mitigation site to assist in tracking the success of the mitigation program and to provide further documentation of the existing site conditions. The photo points will be established during the preparation of the as-built planting plan and ground view photos will be taken during each monitoring year from the same vantage point.

## **7.4 Reporting Requirements**

Reporting will be done in accordance with the regulatory permits issued for the project. The reporting requirements for each agency are discussed below.

### **7.4.1 United States Army Corps of Engineers**

Annual reports will follow the USACE Mitigation Monitoring Guidelines requirements (refer to Appendix A). These annual reports will satisfy the terms and conditions outlined in the Section 404 Nationwide Permit obtained for the project, which are anticipated to be required for salt marsh restoration and for restoration and mitigation for the federally protected Morro manzanita in accordance with the Section 7 approval for the project from the U.S. Fish and Wildlife Service.

### **7.4.2 Central Coast Regional Water Quality Control Board**

Section 401 – Water Quality Certifications issued from the RWQCB typically require submittal of a project completion report and at least two annual monitoring reports for certified projects. A project completion report and annual reports will be prepared to satisfy the requirements of the RWQCB Water Quality Certification acquired for the project.

### **7.4.3 California Department of Fish and Wildlife**

Section 1600 Streambed Alteration Agreements (SAA) issued by CDFW typically require submittal of annual monitoring reports for five consecutive years that include photo documentation to document the progress and status of the revegetation efforts. Annual reports will be prepared to satisfy the requirements of the SAA obtained for the project.

### **7.4.4 California Coastal Commission**

Coastal Development Permits issued by the CCC requires annual reporting.

## **8 Completion of Compensatory Mitigation**

This section explains the process required to close out the mitigation project with the various regulatory agencies, once all the success criteria have been achieved. The necessary documentation to verify that all of the County's mitigation obligations for the project have been satisfied is also explained.

### **8.1 Notifications of Completion**

The County will notify the USACE, RWQCB, and CDFW in writing when the monitoring period is completed and all the designated success criteria for the project have been met. The different permitting regulatory agencies have slightly different requirements and each agencies' obligations will be fulfilled. Following receipt of the final monitoring report and submission of any other required documentation, the County understands that the regulatory agencies may request a site visit to confirm project completion of the compensatory mitigation efforts. If site visits of this nature are requested, the County will comply and facilitate these arrangements accordingly.

## **9 Contingency Measures**

Contingency measures are specific actions that will be taken by the County if it becomes apparent that the success criteria for the mitigation program are not being achieved or if the efforts are likely to fail. These measures will be implemented at any time when necessary and they are intended to reverse the issue and reset the mitigation trajectory so that the performance goals can be attained.

### **9.1 Adaptive Management**

The mitigation sites should be considered self-sustaining when no maintenance or artificial irrigation is required for a period of at least two years. If replanting is determined to be necessary, replanted areas will be monitored and maintained for a duration that is agreeable to the relevant regulatory agencies. If a total site failure is evident, the County will coordinate with the involved regulatory agencies to determine what alternative compensatory mitigation will be required. Similarly, if it becomes apparent that the designated success criteria are not feasible, an alternative set of objectives will be developed. Identification of alternative mitigation sites, planting palettes and/or species may be considered if necessary.

### **9.2 Long-Term Management**

If it becomes apparent that the mitigation efforts will not attain the final success criteria within the expected time frame, the County will begin an assessment of the particular reasons for failure and will work with the involved regulatory agencies to determine an acceptable solution. If the site trends indicate that the success criteria will eventually be met, but in a longer timeframe than anticipated, maintenance and monitoring will continue until the criteria have been satisfied. In this scenario, a time extension will be proposed to the pertinent regulatory agencies by the County and the monitoring period (and possibly the maintenance program) will be extended accordingly. For example, as described in Section 7.1, longer than 5 years may be required to monitor success of slow-growing native oak trees and Morro manzanita.

## 10 References

- California Coastal Commission. 2022. Letter dated March 1, 2022, from Esme Wahl, Coastal Planner, Central Coast District, to Monica Stillman, County of San Luis Obispo, Department of Public Works.
- Central Coast LIDI. 2011. Central California Coast Low Impact Development Bioretention Guidance Technical Assistance Memo. Available at [centralcoastlidi.org/resources.php](http://centralcoastlidi.org/resources.php). Accessed July 29, 2022.
- Miles, A.K., D.H. Van Vuren, D.C. Tsao, and J.L. Yee. 2015. Experimental enhancement of pickleweed, Suisan Bay, California, California Fish and Game 101(2): 87-100.
- San Luis Obispo County Department of Public Works (County). 2021a. South Bay Boulevard Bridge (49C-0351) Replacement Project, Natural Environment Study, Federal Project BRLS-5949(137). San Luis Obispo, California.
- . 2021b. South Bay Boulevard Bridge Replacement Project, Biological Assessment, Federal Project Number BRLS-5949(137). San Luis Obispo, California.
- U.S. Army Corps of Engineers (USACE). 2008a. Checklist for Compensatory Mitigation Proposals, Compensatory Mitigation Checklist – Page 1 of 5. Charleston District, Regulatory Branch. Charleston, South Carolina.
- . 2008b. Compensatory Mitigation for Losses of Aquatic Resources; Final Rule. Federal Register Vol. 73, No. 70: 19594-19705. April 10, 2008.



## **Appendix A. USACE Monitoring Report Guidelines**

## **U.S. Army Corps of Engineers Mitigation and Monitoring Report Requirements**

The required compensatory mitigation monitoring reports shall be a minimum of six pages and a maximum of eight pages. The following information shall be included within the report of the specific pages described below:

Pages 1-2:

A. Project Information:

1. Project Name.
2. Applicant name, address, and phone number.
3. Consultant name, address, and phone number (for permit application, if necessary).
4. Corps permit file number.
5. Acres of impact and type(s) of habitat impacted (or proposed for impact)
6. Date project construction commenced (or proposed to begin).
7. Location of the project and directions to site (including latitude/longitude or UTM coordinates).
8. Date of the report and the corresponding permit conditions pertaining to the compensatory mitigation.
9. Amount and information on any required performance bond or surety.

B. Compensatory Mitigation Site Information:

1. Location and directions to the site (including latitude/longitude or UTM coordinates).
2. Size and type(s) of habitat existing at the site and proposed for restoration, enhancement, and/or creation.
3. Stated purpose/goals for the compensatory mitigation site.
4. Date site construction and planting completed.
5. Dates of previous maintenance and monitoring visits.
6. Name, address, and contact number of responsible agent for the site.
7. Name, address, and contact number for designer.

C. Brief Summary of Remedial Actions(s) and Maintenance of the Compensatory Mitigation Site:

Page 2 or 3:

D. Map of the compensatory mitigation site:

1. 8 ½ x 11-inch diagram of the site including:
  - a) Habitat types (as constructed).
  - b) Locations of photographic record stations.
  - c) Landmarks
  - d) Inset defining location of the site.

Page 3 or 4:

- A. List of Corps-approved success criteria.
- B. Table of results from the monitoring visits versus performance standards for specified target dates.

Page 4, 5, and/or 6:

- A. Photographic record of the site during most recent monitoring visit at record stations (at least four photos on at least one page, no more than two pages).

Page 5, 6, or 7:

- A. Summary of field data taken to determine compliance with performance criteria. At least one page, no more than two pages.

Page 6, 7, 8 (if needed):

- A. Summary of any significant events that occurred on the site that may affect ultimate compensatory mitigation success.

The completed monitoring reports shall be submitted unbound to the Corps for inclusion into the official case file. Electronic copies of these reports can be submitted in lieu of written reports and may be required in the future.



# MORRO MANZANITA

*Proposed Fish and Game Code Section 2084 Regulations*

## **PRESENTATION TO THE CALIFORNIA FISH AND GAME COMMISSION**

June 12, 2025

Julie Vance, Central Region



*Photo Credit: Bob Stafford*



# Background

- Morro Manzanita listed as Candidate species pursuant to the California Endangered Species Act (CESA)
- San Luis Obispo County (County) raised concerns about the impacts of candidacy to ongoing projects
- CDFW has been working collaboratively with the County to evaluate options



Photo Credit: Chris Winchell



Photo Credit: Dave Hacker



Photo Credit: Jason Dart



# South Bay Boulevard Bridge Replacement Project

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- Existing South Bay Boulevard bridge spans Los Osos Creek, built in 1966
- Bridge replacement necessary to meet current seismic standards
- South Bay Boulevard is one of two main access routes to Los Osos and a critical emergency access corridor, including for any evacuations related to Diablo Canyon Nuclear Power Plant
- CEQA document (Mitigated Negative Declaration) adopted by the County August 2021
- Project fully permitted and scheduled to go to bid in June 2025, with construction likely in early 2026
- \$27M of programmed federal funds at risk if construction delayed



# Project Impacts to Morro Manzanita

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- In addition to being a State Candidate, Morro Manzanita is a federally threatened species
- Issued U.S Fish and Wildlife Service and Coastal Commission Project permits address Morro Manzanita
- Project would result in temporary impacts of 0.6 acre and permanent impacts of 0.24 acre of Morro Manzanita habitat
- Between 25-30 individual shrubs would be removed
- Required mitigation will result in 2.52 acres of mitigation habitat, for a net increase of occupied habitat of 0.48 acre, and planting of 113 shrubs
- Opportunity for important knowledge gains about Morro Manzanita preservation and propagation



# Proposed Solution



*Photo Credit: Kristi Lazar*

- Given project timelines and already negotiated Morro Manzanita mitigation with Coastal Commission and US Fish and Wildlife Service, CDFW proposing project specific FGC Section 2084 regulations through the addition of Section 749.14 to Title 14
- Proposed regulations would adopt the required Morro Manzanita mitigation already included in Coastal Commission and U.S. Fish and Wildlife Service permits



# Proposed Regulations (749.14 Title 14)

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- Would authorize take of Morro Manzanita during the candidacy period
- Requires adherence to the U.S. Fish and Wildlife Service Biological Opinion, Coastal Development Permit, Mitigated Negative Declaration, and final Habitat Mitigation and Monitoring Plan (HMMP), including all mitigation obligations
- Would require submittal of reporting required by U.S. Fish and Wildlife Service Biological Opinion and HMMP to CDFW



# Credits | Questions | Contact

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*Photo Credit: Kristi Lazar*





## Staff Summary for June 11-12, 2025

**24. Morro Manzanita Take Provision****Today's Item****Information** ☐**Action** ☒

Receive a recommendation from the Department and consider authorizing publication of notice of intent to authorize take of Morro manzanita while a candidate species under the California Endangered Species Act, pursuant to Section 2084 of the California Fish and Game Code.

**Summary of Previous/Future Actions**

- |                                                                                                            |                         |
|------------------------------------------------------------------------------------------------------------|-------------------------|
| • Morro manzanita officially became a candidate species under the California Endangered Species Act (CESA) | May 16, 2025            |
| • <b>Today's notice hearing</b>                                                                            | <b>June 11-12, 2025</b> |
| • Discussion hearing                                                                                       | August 13-14, 2025      |
| • Adoption hearing                                                                                         | October 8-9, 2025       |

**Background**

On July 20, 2024, the Commission received a petition to list Morro manzanita (*Arctostaphylos morroensis*) as endangered under CESA. At its April 2025 meeting, after review of the Department's petition evaluation report, comments received and discussion, the Commission determined that listing Morro manzanita may be warranted and instructed staff to issue a notice indicating that Morro manzanita is a candidate under CESA. On May 16, 2025, a notice was published in the California Regulatory Notice Register notifying the public that Morro manzanita is a candidate species and temporarily afforded the same protections as a fully listed species, pursuant to Fish and Game Code Section 2085.

During the evaluation phase of the petition, it was brought to the Commission's attention that a project that has completed environmental review in San Luis Obispo County is susceptible to an extensive delay if Morro manzanita were to become a candidate species. The county is undertaking a project to replace the South Bay Boulevard Bridge (No. 49C-0351) (project) so that the bridge meets current seismic design standards and maintains safe, reliable service of a critical access corridor for the Los Osos and Morro Bay communities.

The Department has worked with county public works to draft regulations to allow the county to proceed with its project to replace the South Bay Boulevard Bridge so that the bridge meets seismic design and safety standards. The county plans to issue bids for construction between summer and fall 2025; therefore, this project, while not an emergency, has strict timelines for compliance and to ensure that construction can commence for public safety reasons. The Department considers the restoration and mitigation measures laid out in a habitat mitigation and monitoring plan (HMMP) to adequately compensate for impacts to Morro manzanita from the South Bay Boulevard Bridge project (exhibits 5 and 7). The proposed regulations benefit the county by allowing it to proceed with the South Bay Boulevard Bridge project and may benefit Morro manzanita by creating a Morro manzanita mitigation site that, if successfully implemented, will increase the total area occupied by Morro manzanita.

## Staff Summary for June 11-12, 2025

***Draft Proposed Regulations***

The draft proposed Section 749.14 would allow take of Morro manzanita during CESA candidacy for the bridge project, and represents the culmination of the Department's internal discussions with county public works staff. The draft regulations authorize the county to take Morro manzanita while undertaking the bridge project and associated mitigation and restoration actions, and lists the conditions the county must adhere to for the take authorization. The conditions require that the county comply with restrictions imposed by the U.S. Fish and Wildlife Service and the California Coastal Commission when those agencies reviewed the county bridge project. The conditions also require the county to comply with the negative declaration the county developed pursuant to CEQA. (Exhibits 5-7.)

Further details on the draft proposed regulations are available in the draft initial statement of reasons and draft proposed regulatory language (exhibits 2 and 3).

Today the Department will present an overview of the draft amendments (Exhibit 8).

**Significant Public Comments (N/A)****Recommendation**

***Commission staff:*** Authorize publication of intent to add Section 749.14 related to take of Morro manzanita during candidacy.

***Department:*** Authorize publication of notice of intent to add Section 749.14.

**Exhibits**

1. [Department memo transmitting the draft initial statement of reasons, received June 3, 2025](#)
2. [Draft initial statement of reasons](#)
3. [Proposed regulatory language](#)
4. [Economic and fiscal impact statement \(STD. 399\) and addendum](#)
5. [South Bay Boulevard Bridge Replacement biological opinion](#)
6. [South Bay Boulevard Bridge replacement coastal development permit](#)
7. [South Bay Boulevard Bridge Replacement HMMP](#)
8. [Department presentation](#)

**Motion**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission authorizes publication of a notice of its intent to add Section 749.14, as discussed today.

## Committee Staff Summary for September 12, 2024 WRC Meeting (For Background Purposes Only)

### 2. Periodic Regulation Changes

#### Today's Item

Information ☐

Action ☒

Discussion and potential recommendations for 2025-26 seasons:

- (A) Inland sport fishing
  - I. Striped bass slot limits (discussion only)
  - II. Other recommended changes (discussion only)
- (B) Upland (resident) game bird hunting (potential recommendation)
- (C) Mammal hunting (potential recommendation)

#### Summary of Previous/Future Actions

- Initial vetting May 16, 2024; WRC
- **Today's discussion and potential recommendations** **September 19, 2024**

#### Background

Today the Wildlife Resources Committee (WRC) will hear and discuss Department recommendations for regulation changes on a number of topics, and potentially make recommendations (except for inland sport fishing) to the Commission.

- (A) Inland sport fishing
  - I. *Striped bass slot limits*: This item was referred to WRC as a result of the Commission granting Petition 2020-005, regarding striped bass slot limits. The Department has completed its analysis of the petition's request and will make a recommendation to WRC (see exhibits A1 through A3). WRC is seeking public input on the recommendation and striped bass slot limits in general. In turn, WRC may make a recommendation to the Commission.
  - II. *Other recommended changes*: This is an initial opportunity for interested parties to make suggestions to the Department and WRC regarding potential regulation changes for inland sport fishing. The Department will make its initial recommendations to WRC (Exhibit A4). The second opportunity to discuss ideas with WRC will be its January 2025 meeting, when WRC is expected to make recommendations to the Commission.
- (B) Discussion and potential recommendation for upland (resident) game bird hunting (2025-26) for various resident upland game bird species, which includes California quail, pheasant, wild turkey, and mourning dove.
- (C) Discussion and potential recommendation for mammal hunting (2025-26) for various big game mammals, including deer, Nelson bighorn sheep, pronghorn antelope, and elk (Exhibit C1).

## Committee Staff Summary for September 12, 2024 WRC Meeting (For Background Purposes Only)

Given the Commission's current regulatory staffing limitations, any recommendations made today for regulation changes necessarily will include a caveat from staff that timing for developing rulemaking materials to implement the recommendations will be dependent upon staff capacity. Staff appreciates input from WRC and stakeholders on the relative importance of different proposed actions.

### Significant Public Comments

A hunter proposes several ideas and asks questions with respect to many aspects of mammal hunting, including elk tag allocations (archery tags, the Tehachapi Hunt Zone, and the Marble Mountains Elk Management Unit), the Department Shared Habitat Alliance for Recreational Enhancement Program, black bear hunting, the Department Private Lands Management Program, and chronic wasting disease (Exhibit C2).

### Recommendation

**Commission staff:** Based on the Department's presentation and today's discussion, recommend the Commission support future rulemakings regarding striped bass slot limits and mammal hunting.

**Department:** Support future rulemakings regarding striped bass slot limits and mammal hunting.

### Exhibits

- A1. [Department striped bass presentation](#)
- A2. [Department report](#), *California Department of Fish and Wildlife Valuation of Regulation Change Petition 2022–12: Proposed 20–30–Inch Harvest Slot Limit for Striped Bass (Morone saxatilis)*, received August 29, 2024
- A3. [Department report](#), *California Department of Fish and Wildlife Valuation of Nor-Cal Guides and Sportsmen's Association (NCGASA) Proposed 20-30 Inch Harvest Slot Limit for Striped Bass Appendices*, received August 29, 2024
- A4. [Department inland sport fishing presentation](#)
- C1. Department mammal hunting presentation (to be distributed separately)
- C2. [Email from Mike Costello](#), received August 20, 2024

### Committee Direction/Recommendation

The Wildlife Resources Committee recommends that the Commission support future rulemakings regarding striped bass slot limits and mammal hunting based on the Department's recommendation and today's discussion.



# California Department of Fish and Wildlife Regulation Petition Evaluation 20-30 Inch Striped Bass Slot Limit



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Erin Ferguson  
Senior Environmental Scientist  
CDFW Fisheries Branch

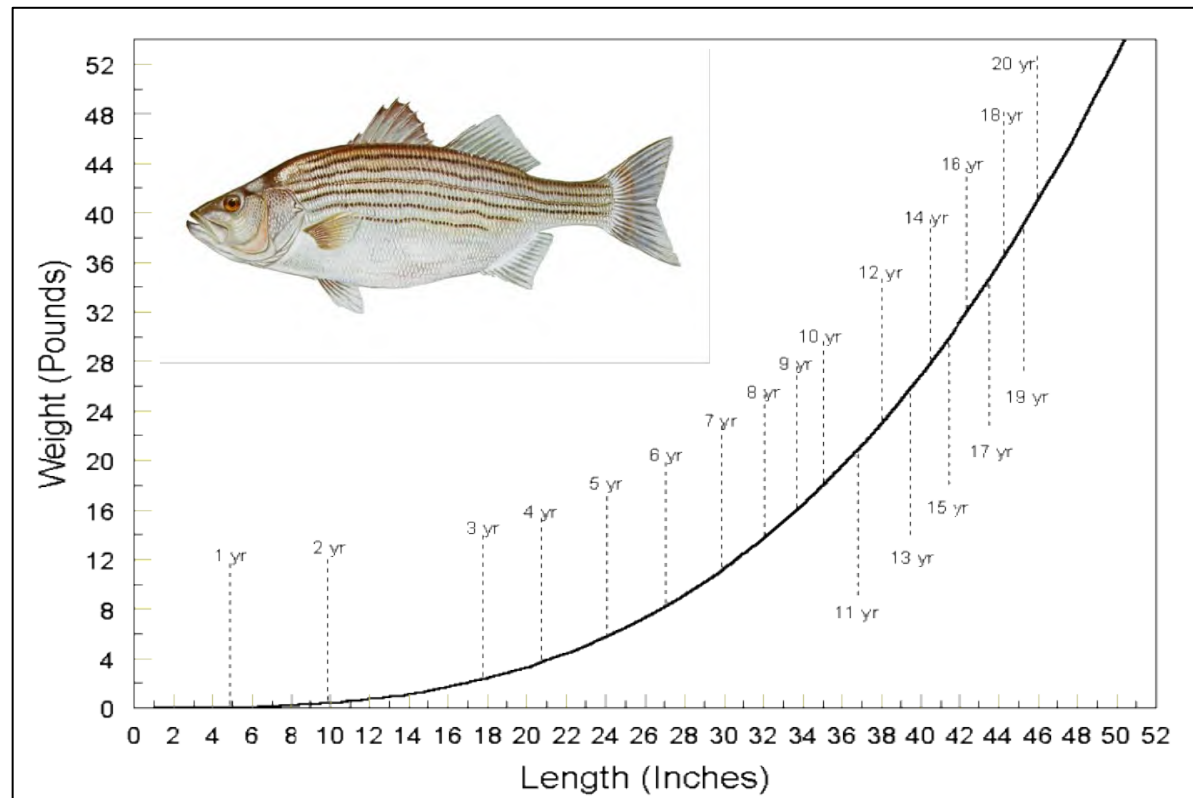
Wildlife Resources Committee Meeting  
September 12, 2024





# Striped Bass (*Morone saxatilis*)

- Native to East Coast
- Long-lived
  - Up to 30 years
- Anadromous
  - Highly migratory
- Maturation
  - Females: age 4-5 (22-24 inches)
- Broadcast spawners
- Opportunistic predators
  - insects, fishes, and crustaceans
  - cannibalistic



Wildlife.ca.gov – Striped Bass Fishing Map



# Petition Background

- **Who** - Petitioner is the Nor-Cal Guides and Sportsmen's Association (NCGASA)
- **What** - Restrict the harvest of Striped Bass (SB) to a harvest slot limit (HSL) of 20-30 inches for inland anadromous and marine waters
- **Why** - NCGASA stated goal:
  - To protect the species by increasing the minimum length to allow more fish to mature and successfully spawn prior to harvest and
  - To protect the larger fish that tend to be the most prolific spawners and are becoming increasingly rare in the fishery
- **Current regulations**- 18-inch minimum length limit, 2 fish daily bag limit



# FGC Striped Bass Policy

The Department of Fish and Wildlife shall...

- Ensure, enhance, & prevent loss of sport fishing opportunities
- Aim to maintain a self-sustaining Striped Bass population in support of a robust recreational fishery *while adhering to the Department's long-term mission related to threatened, endangered species, and other species of greatest conservation need*
- Work with relevant stakeholders, organizations, and the public to develop appropriate objectives to achieve these broad aims



# CDFW Evaluation Contents

- Population and Fishery Trends:
    - Existing fisheries monitoring data
    - Marine and Inland Creel survey data
  - Public Input\*
  - Population and fishery impacts of regulatory changes\*
- Atlantic States SB regulations
  - Predation impacts\*

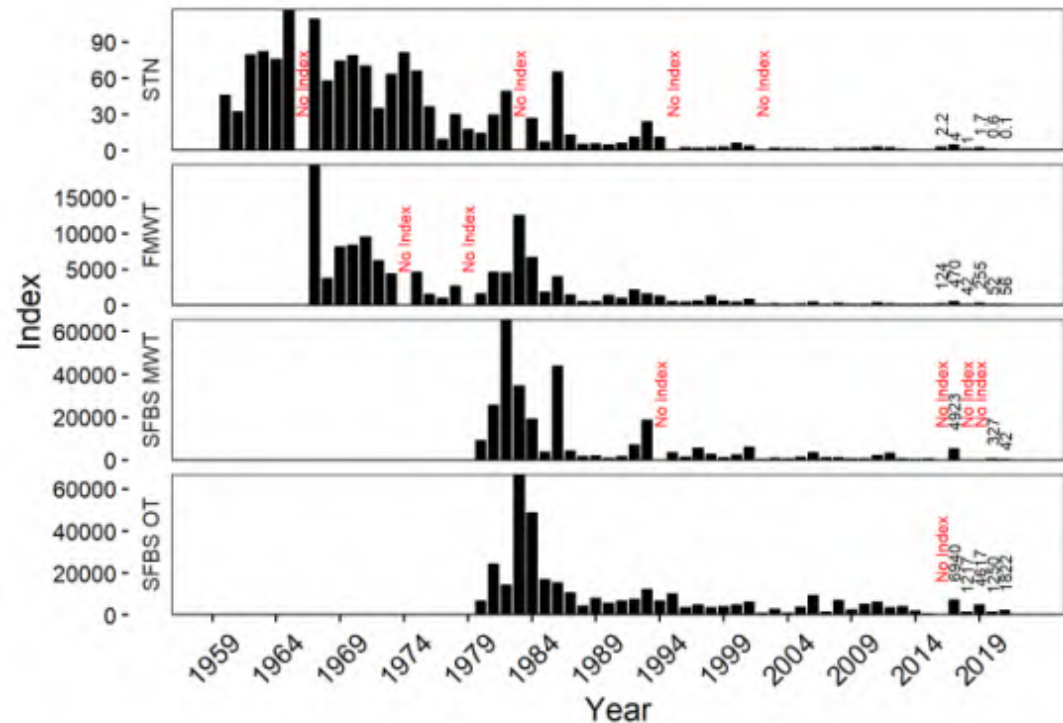
*\*Additional information included in Appendices*



# Population Trends

## Juvenile abundance surveys (fishery independent surveys)

- Indicate some level of decline in catch of age-0 or young SB
  - Potential lateral shift in habitat usage by SB not well captured by survey methods



Malinich et al. 2022



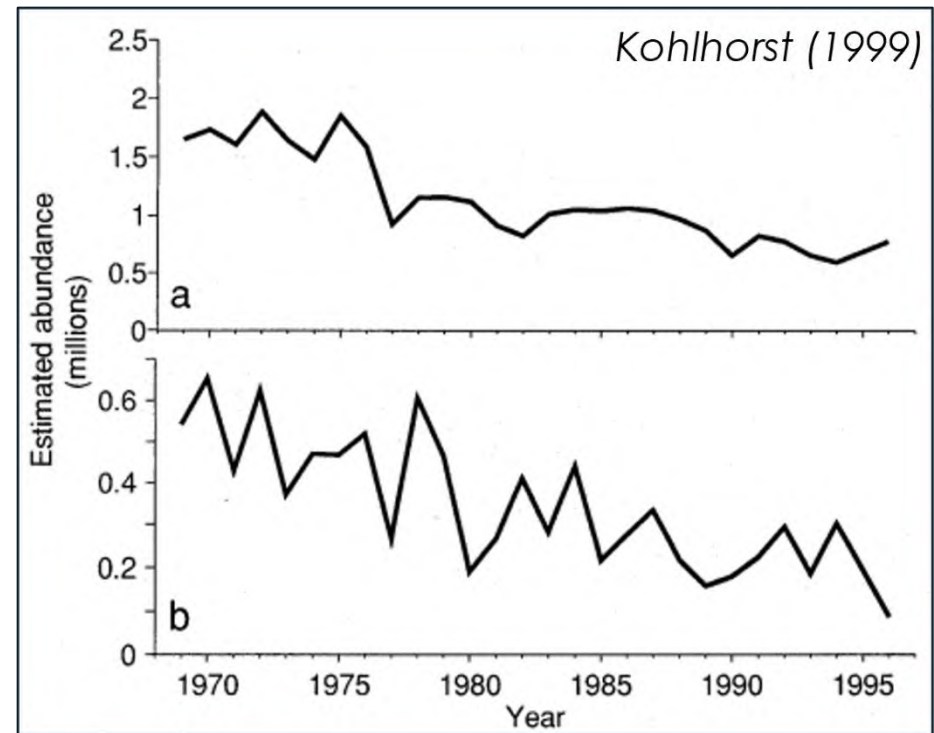


# Population Trends Cont.

## Adult population monitoring

(fishery dependent data)

- Mark-recapture (Lincoln-Petersen Estimator):
  - Adult population numbers (**a**) and age-3 abundance (**b**) have declined from historical levels, but overall appear stable (**a**)
- Harvest and harvest rate (Lincoln-Harvest estimator):
  - ~1,157,275 > 18 inches TL (average, 2011-2016)

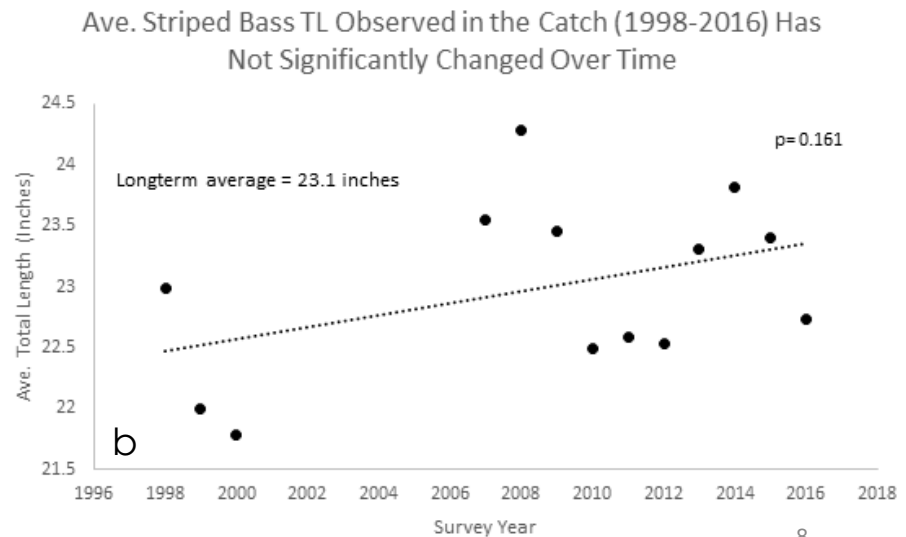
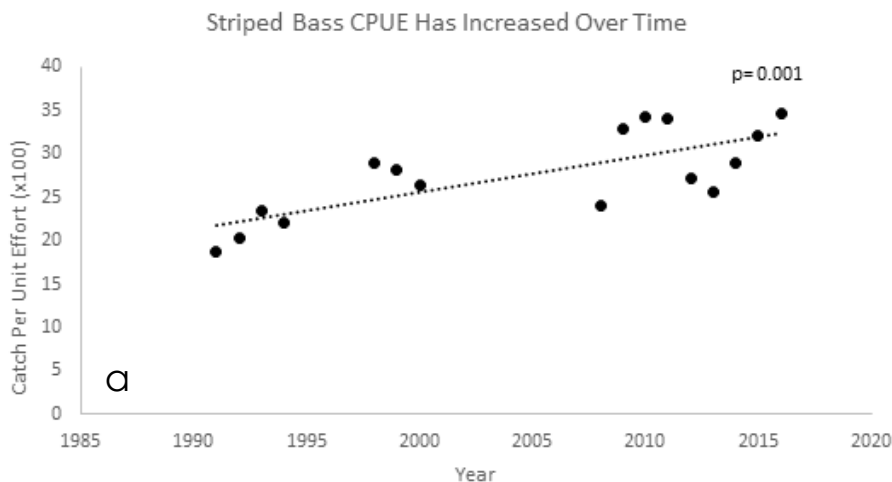




# Fishery Trends

## 1991-2022 Creel Data (fishery dependent surveys)

- Angling effort targeting Striped Bass **has not** significantly changed
- Catch and Catch-per-unit-effort (CPUE, Fig. a) **have** significantly increased
- Harvest **has not** significantly changed over time
- Number of SB released over time **has** significantly increased
- Mean size of SB harvested **has not** significantly changed (~23 in; Fig. b)





# Public Input

## **Joint Public Town Hall Meeting (August 24, 2022)**

- Purpose – discuss the NCGASA regulation change petition and CDFW's evaluation plan
- Well Attended with 50 in-person and 100 virtual participants
- Majority of commenters (40/45) supported 20-30-inch HSL

## **Angler Preference Questionnaire (July 26, 2022 – October 31, 2022)**

- Purpose – Better understand anglers' sentiments about the SB fishery
- Distributed through email and social media
- Available in 7 languages (English, Spanish, Tagalog, Traditional Chinese, Simplified Chinese, Russian, Vietnamese)
- Questionnaire vetted for bias and leading language



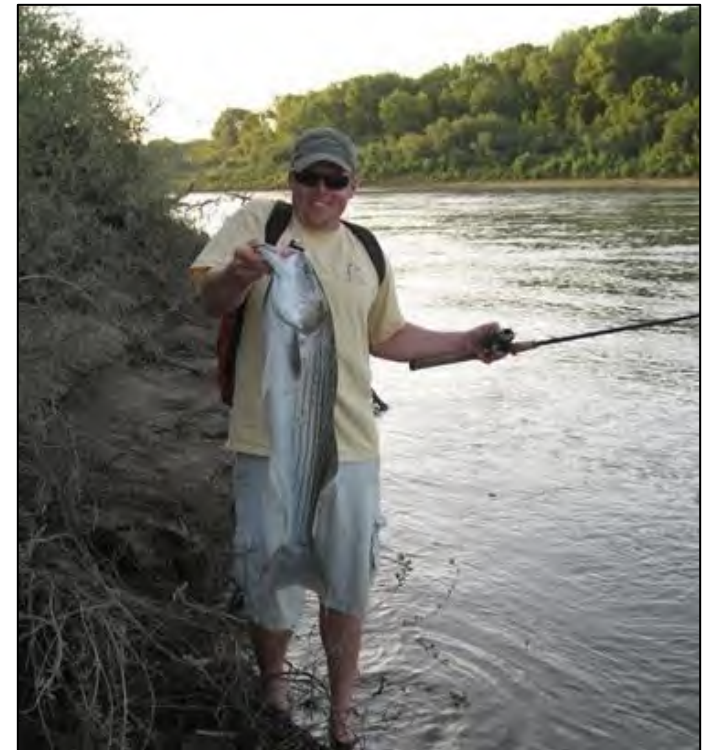
# Questionnaire Results

## 26,410 Total responses

- 18,751 respondents fish for SB
- 7,659 did not fish for SB

## Brief results

- 71% of Striped Bass anglers support the current minimum size limit (MSL)
- If given the option
  - 54% of respondents would not change the MSL
  - 28% would either lower or no limit at all
- Trophy fish
  - 64% of respondents were in favor of catch-and-release trophy fishery
  - 30 inches (26%), 36 inches (15%),  $\geq 40$  inches (21%)



*Photo credit: Erin Ferguson*



# Predicting the Impact of Regulatory Changes

**Goal:** Understand potential population and fishery tradeoffs resulting from proposed regulatory changes

**Approach:** Developed a sex-specific, age and size-structured population model for West Coast Striped Bass following methods in Gwinn et al. (2013)



Original Article

## Rethinking length-based fisheries regulations: the value of protecting old and large fish with harvest slots

Daniel C Gwinn ✉ Micheal S Allen, Fiona D Johnston, Paul Brown, Charles R Todd, Robert Arlinghaus

First published: 07 September 2013 | <https://doi.org/10.1111/faf.12053> | Citations: 134

[Read the full text >](#)

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### Abstract

Managing fisheries using length-based harvest regulations is common, but such policies often create trade-offs among conservation (e.g. maintaining natural age-structure or spawning stock biomass) and fishery objectives (e.g. maximizing yield or harvest numbers). By focusing harvest on the larger (older) fish, minimum-length limits are thought to maximize biomass yield, but at the potential cost of severe age and size truncation at high fishing mortality. Harvest-slot-length limits (harvest slots) restrict harvest to intermediate lengths (ages), which may contribute to maintaining high harvest numbers and a more natural age-structure. However, an evaluation of minimum-length limits vs. harvest slots for jointly meeting fisheries and conservation objectives across a range of fish life-history strategies is currently lacking. We present a general age- and size-structured population model calibrated to several recreationally important fish





# Predicting the Impact of Regulatory Changes Cont.

**Approach:** Evaluated how the following metrics would change in response to implementing a 20-30-inch HSL (proposed), 18-30-inch HSL (alternative), or 28-35-inch HSL (conservative) regulation:

- Stock Conservation:

- Probability of recruitment overfishing (exploitation at a rate beyond stock replacement)
- Proportion of fecundity contribution from older females (>10 years)

- Fishery:

- Total catch, total harvest, and Trophy-size (> 30 inches) catch

**Data:** Input parameter data informed by multiple data sources, published values, and life-history theory



# Model Results

## Relative to the current 18-inch MLL:

- Probability of recruitment overfishing decreased under evaluated HSLs vs current 18-inch MLL
  - 20-30-inch HSL: ↓ 19%
  - 18-30-inch HSL: ↓ 14%
  - 28-35- inch HSL: ↓ 32%
- Reproductive contributions from older (thus larger) females increase under evaluated HSL vs MLL
- Increase in catch and trophy catch under evaluated HSLs
- Decrease in total harvest under evaluated
  - 20-30-inch HSL: ↓ 21%
  - 18-30-inch HSL: ↓ 8%
  - 28-35-inch HSL: ↓ 73%





# Model Take-aways

- More favorable outcomes for nearly all management priorities (stock conservation and fishery) under evaluated HSLs compared to the currently enforced 18-inch MLL.
- Largest improvements were to the risk of recruitment overfishing [decreased] and catch of trophy-sized fish [increased]
- HSL Tradeoff: harvest numbers
- Effectiveness of HSLs can differ based on management priority:
  - Harvest: best supported by current MLL, or wide HSL
  - Population conservation: restrictive HSL to protect mature size-classes
  - Angler experience: HSLs that balance harvest and conservation



# CDFW Does Not Support Increasing Lower Limit

## **CDFW does not support increasing the MLL from 18 inches to 20 inches**

- Stock Conservation:

- Similar gains in recruitment under 20-inch vs 18-inch lower slot limit (paired with 30-inch upper limit)
- Greatest potential recruitment gains come from 30-inch harvest cap, not from shifting lower limit size

- Harvest:

- Greater loss of harvest opportunity
  - 21% decrease in harvest under an 20-30-inch HSL vs an 8% decrease in under an 18-30-inch HSL
- 18 and 19-inch Striped Bass represent ~ 20% of the harvest (creel surveys)
- Harvest loss disproportionately affects disadvantaged communities
- Increasing the lower limit will likely increase discard mortality



# CDFW Does Not Support Increasing Lower Limit (cont.)

## **CDFW does not support increasing the MLL from 18 inches to 20 inches**

- Predation considerations
  - Increased abundance of juvenile SB (which are more likely to consume smaller prey items such as salmonids at certain times of year) may increase predation on native and non-native species
- Angler Preference Questionnaire results indicate low support
  - 71% (11,981 out of 16,875) of respondents support the current minimum size retention at 18 inches
  - If given the option:
    - 54% (8,975 out of 16,621) of respondents did not support changing the minimum size limit from 18 inches
    - 28% (4,653 out of 16,621) supported lowering the minimum size or no minimum size at all





# CDFW Could Support Implementing a 30-inch Upper Slot Limit

- **Benefit to anglers**

- Create trophy fishery
- Predicted to increase total catch
- 18-30-inch HSL resulted in less impact to current harvest levels (8% predicted loss) compared to a 20-30-inch HSL (21% predicted loss)

- **Population benefits**

- Decreases risk of recruitment overfishing compared to MLL
- Predicted to increase egg contribution from older fish to total fecundity
  - Performs similarly to 20–30-inch HSL



Photo credit: Central Valley Angler Survey



# Uncertainties and Additional Considerations

- It is unknown how environmental conditions (flow, temperature, water quality, etc.) constrain the Striped Bass population growth
- Implementing a slot limit will require modification to spear fishing regulations, which includes restricting as a method of take
- Discard mortality may increase as a result of a HSL regulation change
- Unknown effects of Striped Bass predation
- Lack of funding prevents current Striped Bass adult population monitoring to measure the effectiveness or impact of a regulation change





# CDFW Conclusions

## Petition Evaluation Biological Conclusion

- The added protection of raising the lower harvest limit to 20 inches is unlikely to provide the intended benefits of increased recruitment due to spawning of early-maturing females, as stated by petitioners.
- A 30-inch upper slot limit is more likely to provide stock conservation benefits through increased recruitment resulting from protections for older, larger spawning females.

## Slot Limit Support

- While adult population and creel survey data suggest that the Striped Bass population is relatively stable in recent decades, *CDFW could support a slot limit to:*
  - 1) improve population resiliency to environmental stochasticity/perturbations
  - 2) improve the angling experience
    - Catch-and-release trophy fishery
    - Angler Preference Questionnaire showed general support for an upper limit

**CDFW could support either “no change” or an 18-30-inch HSL**

# Questions?



Thank you!

California Department of Fish and Wildlife  
[StripedBass@wildlife.ca.gov](mailto:StripedBass@wildlife.ca.gov)

## Memorandum

**Date:** May 7, 2025

**To:** Melissa Miller-Henson  
Executive Director  
Fish and Game Commission

**From:** Charlton H. Bonham  
Director

**Subject:** **Submission of Initial Statement of Reasons for the June 11-12, 2025, Fish and Game Commission Meeting to Amend Sections 5.75(c) and (d), and 27.85(c) Title 14, California Code of Regulations, Re: Striped Bass Harvest Size Limits**

The Department of Fish and Wildlife (Department) requests the Fish and Game Commission (Commission) authorize publication of notice of its intent to amend sections 5.75(c) and (d), and 27.85(c) Title 14, California Code of Regulations, for the upcoming sport fishing regulatory cycle. The proposed regulatory changes are needed to effectively manage California's striped bass sport fishery. Authorization of this request will allow for possible adoption at the October 2025 Commission meeting.

The Department is submitting the attached Initial Statement of Reasons (ISOR) with a proposal to impose a slot limit within anadromous and marine waters north of Point Conception whereby only striped bass from 18 to 30 inches would be available for harvest in the sport fishery, with no proposed change to the bag limit. Currently, any striped bass 18 inches or greater may be harvested within anadromous and marine waters with a daily bag limit of two fish.

If you have any questions regarding this item, please contact Jay Rowan, Fisheries Branch Chief or Marguerite McCann, Senior Environmental Scientist, at [Fisheries@wildlife.ca.gov](mailto:Fisheries@wildlife.ca.gov).

ec: Chad Dibble, Deputy Director  
Wildlife and Fisheries Division

Jay Rowan, Branch Chief  
Fisheries Branch

David Thesell, Deputy Director  
Fish and Game Commission



Melissa Miller-Henson, Executive Director  
Fish and Game Commission  
May 7, 2025  
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State of California  
Fish and Game Commission  
Initial Statement of Reasons for Regulatory Action

Amend Sections 5.75(c) and (d), and 27.85(c)  
Title 14, California Code of Regulations  
Re: Striped Bass Harvest Size Limits

I. Date of Initial Statement of Reasons: March 27, 2025

II. Dates and Locations of Scheduled Hearings

(a) Notice Hearing

Date: June 11, 2025

Location: Sacramento, CA

(b) Discussion Hearing

Date: August 13, 2025

Location: Sacramento, CA

(c) Adoption Hearing

Date: October 8, 2025

Location: Sacramento area

III. Description of Regulatory Action

(a) Statement of Specific Purpose of Regulatory Change and Factual Basis for Determining that Regulation Change is Reasonably Necessary

Unless otherwise specified, all section references in this document are to Title 14 of the California Code of Regulations (CCR). “Commission” refers to the California Fish and Game Commission unless otherwise specified. “Department” or CDFW refers to the California Department of Fish and Wildlife unless otherwise specified.

The Department sets management actions and regulations for the striped bass (*Morone saxatilis*) fishery in California. Currently, any striped bass 18 inches or greater may be harvested within anadromous and marine waters north of Point Conception with a daily bag limit of two fish. The proposed regulation change would impose a “slot limit” within these waters whereby only striped bass from 18 to 30 inches total length would be available for harvest in the sport fishery, with no proposed change to the bag limit or season. A slot limit is a management tool that is designed to allow fish within the size range “slot” to be legally harvested while protecting fish outside that slot.

Striped bass are native to the East and Gulf Coasts of North America and were introduced to San Francisco Bay in 1879. A commercial fishery was established in the San Francisco Bay area by the late 1880s (Scofield 1930). To protect the increasingly popular sport fishery, the commercial striped bass fishery closed in 1935. Prior to 1956, fishing regulations generally included a 12-inch minimum length limit (MLL) and a five fish daily bag limit. From 1956–1981 the MLL increased to 16 inches with a daily bag limit reduction to three fish (Stevens and Kohlhorst 2001). In response to declines in legal-size striped bass in the 1970’s (Kohlhorst 1999) and at the request of anglers, the California legislature established a Striped Bass Management Plan in 1981, which included stocking striped bass in California rivers using private and state-run hatcheries. In the same year,

striped bass regulations were further restricted to an 18-inch MLL and a daily bag limit of two fish (Title 14 CCR 5.75, Title 14 CCR 27.85), which remain in effect today.

The Striped Bass Management Plan was terminated in 2004 due to observed increases in the striped bass population and growing concern over the impact of striped bass predation on native fish species (SB 692, 2003). In 2020, the Commission unanimously adopted an amendment to the striped bass policy that eliminated a numeric target for population size and replaced it with a broader commitment to sustain striped bass populations in support of a robust and self-sustaining recreational fishery (Commission, 2020).

The Nor-Cal Guides and Sportsmen's Association (NCGASA) submitted a regulation change proposal to the Commission on August 1, 2022 (Tracking number [TN] 2022-12). The proposal was to change the MLL from 18 inches to 20 inches and impose a maximum size of 30 inches. The stated goals were:

- To protect the species by increasing the minimum length to allow more fish to mature and successfully spawn prior to harvest, and
- To protect the larger fish that tend to be the most prolific spawners and are becoming increasingly rare in the fishery

At its December 2022 meeting, the Commission granted the petition, 2022-12, for consideration in a future rulemaking, along with previously-granted Petition 2020-005 requesting a freshwater striped bass slot limit. The Commission directed staff to align specific proposed regulations with those developed for Petition 2020-005. Initial discussions took place at the January 2023 Wildlife Resources Committee meeting.

The Department examined the necessity of the proposed changes and developed a report, *California Department of Fish and Wildlife Evaluation of Nor-Cal Guides and Sportsmen's Association (NCGASA) Proposed 20-30 Inch Harvest Slot Limit (HSL) for Striped Bass*. On September 12, 2024, the Department provided the Wildlife Resources Committee with a presentation of the report's findings. The Department recommendation is as follows:

"The Department does not recommend a 20-30-inch Harvest Slot Limit (HSL) as proposed in the petition. The Department recommends maintaining the current 18-inch MLL regulation and is supportive of establishing an upper HSL. Modeling suggests a 30-inch upper limit could result in decreased risk of recruitment overfishing (and thus stock conservation benefits) and increased catch and trophy fishing opportunity, but it cannot confirm if 30 inches is the most appropriate size due to the narrow scope of the current analysis. While there is public support for maintaining the 18-inch MLL (71% of respondents) and establishing a catch-and-release trophy fishery (64% of respondents), the highest percentage of respondents supported no change in harvest regulations (54% of respondents) in the Striped Bass Angler Preference Questionnaire. Creel data suggest that the Striped Bass fishery in California is currently stable, and the current regulations are not contributing to perceived population declines; however, modeling results suggest that the current 18-inch MLL on its own may not be adequate for long-term population stability and growth."

At the September 12, 2024, Commission's Wildlife Resources Committee meeting, the Department presented its support of an 18-30-inch HSL rather than a 20-30 inch HSL. The data show it would benefit anglers by creating a trophy fishery and increasing total catch. Additionally,

modeling indicates it would decrease risk of recruitment overfishing, and increase egg contribution from older fish to total fecundity.

The Department does not support increasing the MLL from 18-20 inches because it would likely not produce the biological or fisheries responses described in the petition. The Department has determined that increasing the current MLL from 18- 20 inches fails to provide sufficient protections to sexually mature female striped bass and would not provide the fisheries response sought. The potential for increased population fecundity contributed by mature females between 18 and 20 inches is negligible based on the percentage of female maturity in that size and age range. Additionally, increasing the MLL to 20 inches is not supported by the angling public contacted through an electronic questionnaire distributed by the Department (n = 18,751). The Striped Bass Angler Preference Questionnaire indicated that 71% supported the current 18-inch MLL. The Department is proposing changes to the following regulations in Title 14, CCR:

- Amend Section 5.75 Striped Bass, subsection (c)
  - Add the maximum harvest size limit of 30 inches.
  - Add reference to the section defining anadromous waters.
  - Amend text to replace references of “minimum size limit” to “harvest size limit”.
    - These changes are necessary to address the petition’s request to provide a 30-inch upper limit which could result in decreased risk of recruitment overfishing (and thus stock conservation benefits) and increased catch and trophy fishing opportunity.
- Add Section 5.75 Striped Bass, subsection (d)(2)
  - Add subsection that specifies that in non-anadromous waters not mentioned in 5.75(d)(1), a minimum size of 18 inches total length and a harvest bag limit of 2 applies.
    - This change is necessary to clarify that the proposed regulation change only applies to anadromous waters and that non-anadromous water regulations for striped bass will not change.
- Amend Section 27.85 Striped Bass, subsection (c)
  - Add the maximum harvest size limit of 30 inches.
  - Amend text to replace references of “minimum size limit” to “harvest size limit”.
    - This change is necessary to address the petition’s request to provide a 30-inch upper limit which could result in decreased risk of recruitment overfishing (and thus stock conservation benefits) and increased catch and trophy fishing opportunity.

#### (b) Goals and Benefits of the Regulation

As stated in Fish and Game Code Section 1700, Conservation of Aquatic Resources, it is the policy of this state to encourage the conservation, maintenance, and utilization of the living resources of the ocean and other waters under the jurisdiction and influence of the state for the

benefit of all the citizens of the state and to promote the development of local fisheries and distant water fisheries based in California in harmony with international law, respecting fishing and the conservation of the living resources of the ocean and other waters under the jurisdiction and influence of the state. The objectives of this policy include, but are not limited to, the maintenance of sufficient populations of all species of aquatic organisms to ensure their continued existence, and the maintenance of a sufficient resource to support a reasonable sport use. Adoption of scientifically based harvest size limits, and bag and possession limits provide for the maintenance of sufficient sport fish populations to ensure their continued existence.

The benefits of the proposed regulations are consistent with the sustainable management of California's sport fisheries, general health and welfare of California residents, and promotion of businesses that rely on sport fishing throughout California.

(c) Authority and Reference Sections from Fish and Game Code for Regulation

Authority: Section(s) 200, 205, 265, 270, and 275, Fish and Game Code

Reference: Section(s) 110, 200, 205 and 265, Fish and Game Code

(d) Specific Technology or Equipment Required by Regulatory Change

None.

(e) Identification of Reports or Documents Supporting Regulation Change

Commission Petition 2020-005: Striped Bass Slot Limit

Commission Petition 2022-12: Striped Bass Slot Limit (inland & marine)

California Department of Fish and Wildlife, 2024. Evaluation of Regulation Change Petition 2022-12: Proposed 20 – 30-inch harvest slot limit for Striped Bass (*Marone saxatalis*).

California Department of Fish and Wildlife, 2024. Evaluation of Nor-Cal Guides and Sportsmen's Association (NCGASA) Proposed 20 – 30-inch harvest slot limit for Striped Bass (Appendices) (*Marone saxatalis*).

Kohlhorst, D. W. 1999. Status of striped bass in the Sacramento–San Joaquin Estuary. California Fish and Game 85(1):31–36.

Scofield, E.C. 1930. The Striped Bass of California (*Roccus lineatus*). Division of Fish and Game of California Fish Bulletin No. 29. 84 pp.

Stevens, D.E. and D.W. Kohlhorst. 2001. California's Marine Living Resources: A Status Report. California Department of Fish and Game. pp 460–464. Available at <https://wildlife.ca.gov/Conservation/Marine/Status/2001#28129681-frontmatter-introduction-background>.

(f) Public Discussions of Proposed Regulations Prior to Notice Publication

The rulemaking was proposed by stakeholders at the public Striped Bass Town Hall meeting on August 24, 2022. CDFW also sent out an Angler Preference Survey to ~1 million anglers in summer-fall 2022.



Proposed regulations were discussed at the January 11, 2023, September 12, 2024 and January 15, 2025 Fish and Game Commissions Wildlife Resources Committee meetings.

#### IV. Description of Reasonable Alternatives to Regulatory Action

##### (a) Alternatives to Regulation Change

The petitioners requested the implementation of a 20-30 inch harvest slot limit. In its evaluation, the Department found that this slot limit would reduce recreational fishing opportunities while not producing sufficiently improved biological or fisheries responses beyond the proposed 18-30 inch harvest slot limit recommendation. Upon consultation, NCGASA endorsed the 18-30 inch harvest slot limit. No other alternative regulation was identified by or brought forward to the Department that would result in the same desired regulatory effect.

##### (b) No Change Alternative

The no change alternative would leave the current regulations in place.

##### (c) Description of Reasonable Alternatives that Would Lessen Adverse Impact on Small Business

None.

#### V. Mitigation Measures Required by Regulatory Action

The proposed regulatory action will have no significant adverse effect on the environment, and therefore, no mitigation measures are needed.

#### VI. Impact of Regulatory Action

The potential for significant statewide adverse economic impacts that might result from the proposed regulatory action has been assessed, and the following initial determinations relative to the required statutory categories have been made:

##### (a) Significant Statewide Adverse Economic Impact Directly Affecting Businesses, Including the Ability of California Businesses to Compete with Businesses in Other States

The Commission does not anticipate any statewide adverse economic impacts that would directly affect businesses within the state or would affect their ability to compete with businesses in other states. The proposed changes provide clarification of existing regulations regarding the size limits for taking striped bass that are necessary for the continued preservation of the resource without changing fishing opportunities via changes to take limits and thus, the prevention of adverse economic impacts.

##### (b) Impact on the Creation or Elimination of Jobs Within the State, the Creation of New Businesses or the Elimination of Existing Businesses, or the Expansion of Businesses in California; Benefits of the Regulation to the Health and Welfare of California Residents, Worker Safety, and the State's Environment

The Commission is not aware of any impacts from the proposed action that would affect the creation or elimination of existing businesses, the expansion of businesses doing business within California, or any benefits to the health and welfare of California residents or to worker safety. The proposed action is not anticipated to change the level of fishing activity enough to

affect the demand for goods and services related to striped bass sportfishing enough to impact the demand for labor, nor induce the creation of new businesses, nor eliminate or induce the expansion of businesses in California. The adoption of scientifically based harvest size limits and bag and possession limits provide for the maintenance of sufficient sport fish populations to ensure their continued existence. The Commission believes Californians will benefit generally from stable populations of striped bass in California's waters and the associated recreational outdoor opportunities.

(c) Cost Impacts on a Representative Private Person or Business

The Commission is not aware of any private sector cost impacts that a representative private person or business would necessarily incur in reasonable compliance with the proposed action. The proposed changes do not change any fees or create new penalties to be fined and are not anticipated to change the level of fishing activity enough to affect the demand for goods and services related to the recreational sport fishing industry.

(d) Costs or Savings to State Agencies or Costs/Savings in Federal Funding to the State

The Commission does not anticipate any costs or savings to state agencies as a result of the proposed regulations, nor does it anticipate costs or savings in Federal Funding to the State.

(e) Nondiscretionary Costs/Savings to Local Agencies

None.

(f) Programs Mandated on Local Agencies or School Districts

None.

(g) Costs Imposed on Any Local Agency or School District that is Required to be Reimbursed Under Part 7 (commencing with Section 17500) of Division 4, Government Code

None.

(h) Effect on Housing Costs

None.

VII. Economic Impact Assessment

(a) Effects of the Regulation on the Creation or Elimination of Jobs Within the State

The Commission is not aware of any impacts from the proposed action that would affect the creation or elimination of jobs within the state, as the proposed action is not anticipated to change the level of fishing activity enough to affect the demand for goods and services related to striped bass sportfishing enough to impact the demand for labor.

(b) Effects of the Regulation on the Creation of New Businesses or the Elimination of Existing Businesses Within the State

The Commission is not aware of any impacts from the proposed action that would affect the creation of new businesses or the elimination of existing businesses, as they are not anticipated to change the level of fishing activity enough to affect the demand for goods and

services related to striped bass sportfishing in a way that would induce the creation of new businesses or eliminate any existing businesses in California.

(c) Effects of the Regulation on the Expansion of Businesses Currently Doing Business Within the State

The Commission is not aware of any impacts from the proposed action that would affect the expansion of businesses doing business within California, as they are not anticipated to change the level of fishing activity enough to affect the demand for goods and services related to striped bass sportfishing enough to induce the expansion of businesses currently doing business within California.

(d) Benefits of the Regulation to the Health and Welfare of California Residents

None.

(e) Benefits of the Regulation to Worker Safety

None.

(f) Benefits of the Regulation to the State's Environment

The adoption of scientifically based harvest size limits and bag and possession limits provide for the maintenance of sufficient sport fish populations to ensure their continued existence.

(g) Other Benefits of the Regulation

None.

## Informative Digest/Policy Statement Overview

Currently, any striped bass 18 inches or greater may be harvested within anadromous and marine waters north of Point Conception with a daily bag limit of two fish. The proposed regulation change would impose a slot limit within these waters whereby only striped bass from 18 to 30 inches total length would be available for harvest in the sport fishery, with no proposed change to the bag limit or season.

Striped bass are native to the East and Gulf Coasts of North America, and were introduced to San Francisco Bay in 1879. A commercial fishery was established in the San Francisco Bay area by the late 1880s but closed in 1935. Prior to 1956, fishing regulations generally included a 12-inch minimum length limit (MLL) and a five fish daily bag limit. From 1956–1981 the MLL increased to 16 inches with a daily bag limit reduction to three fish. In response to declines in legal-size striped bass in the 1970's and at the request of anglers, the California legislature established a Striped Bass Management program in 1981, which included stocking striped bass in California rivers using private and state-run hatcheries. In the same year, striped bass regulations were further restricted to an 18-inch MLL and a daily bag limit of two fish, which remain in effect today. The Striped Bass Management Plan was ended in 2004 due to increases in the striped bass population and concern over the impact of striped bass predation on native fish species. In 2020, the Fish and Game Commission committed to sustain striped bass populations in support of a recreational fishery.

The Nor-Cal Guides and Sportsmen's Association (NCGASA) submitted a regulation change proposal to the Fish and Game Commission on August 1, 2022 (Tracking number [TN] 2022–12). The proposal was to change the MLL from 18 inches to 20 inches and impose a maximum size of 30 inches. The stated goals were:

- To protect the species by increasing the minimum length to allow more fish to mature and successfully spawn prior to harvest and
- To protect the larger fish that tend to be the best spawners and are becoming increasingly rare in the fishery

The Department developed a report, California Department of Fish and Wildlife Evaluation of Nor-Cal Guides and Sportsmen's Association (NCGASA) Proposed 20-30 Inch Harvest Slot Limit (HSL) for Striped Bass. On September 12, 2024, the Department provided the Wildlife Resources Committee with a presentation of the report's findings. The Department supported an 18-30-inch HSL because it would benefit anglers by creating a trophy fishery and increasing total catch.

The Department is proposing changes to the following regulations in Title 14, CCR:

- Amend Section 5.85 Striped Bass, subsection (c)
  - Add the maximum harvest size limit of 30 inches.
  - Add reference to the section defining anadromous waters.
  - Amend text to replace references to "minimum size limit" with "harvest size limit".
- Add Section 5.85 Striped Bass, subsection (d)(2)
  - Add section that specifies that in non anadromous waters not mentioned in 5.75(d)(1), a minimum size of 18 inches total length and a harvest bag limit of 2 applies.
- Amend Section 27.85 Striped Bass, subsection (c)

- Add the maximum harvest size limit of 30 inches.

Amend text to replace references to “minimum size limit” with “harvest size limit”.

#### Benefits of the Regulations:

As stated in Fish and Game Code Section 1700, Conservation of Aquatic Resources, it is the policy of this state to encourage the conservation, maintenance, and utilization of the living resources of the ocean and other waters under the jurisdiction and influence of the state for the benefit of all the citizens of the state and to promote the development of local fisheries and distant water fisheries based in California in harmony with international law, respecting fishing and the conservation of the living resources of the ocean and other waters under the jurisdiction and influence of the state. The objectives of this policy include, but are not limited to, the maintenance of sufficient populations of all species of aquatic organisms to ensure their continued existence, and the maintenance of a sufficient resource to support a reasonable sport use. Adoption of scientifically based harvest size limits, and bag and possession limits provide for the maintenance of sufficient sport fish populations to ensure their continued existence.

The benefits of the proposed regulations are consistent with the sustainable management of California’s sport fisheries, general health and welfare of California residents, and promotion of businesses that rely on sport fishing throughout California.

#### Consistency and Compatibility with Existing Regulations:

Article IV, Section 20 of the State Constitution specifies that the Legislature may delegate to the Commission such powers related to the protection and propagation of fish and game as the Legislature sees fit. The Legislature has delegated authority to the Commission to promulgate recreational fishing regulations (Fish and Game Code sections 200 and 205). Commission staff has searched the California Code of Regulations and has found no other state regulations that address the recreational take of striped bass. The Commission has reviewed its own regulations and finds that the proposed regulations are consistent with other recreational fishing regulations in Title 14, CCR, and therefore finds that the proposed regulations are neither inconsistent nor incompatible with existing state regulation.



### Proposed Regulatory Language

Subsection (c) and (d) of Section 5.75, Title 14, CCR, is amended to read:

#### § 5.75. Striped Bass.

(a) Open season: All year except for closures listed in special regulations.

(b) Limit: Two, except in waters listed in (d) below.

(c) ~~Minimum-Harvest size limit: No fish less than 18 inches or greater than 30 inches total length may be taken or possessed in anadromous waters as defined in Section 1.04, Title 14, CCR, and inland waters as defined in Section 1.53, Title 14, CCR except in waters listed in (d) below.~~

(d) Exceptions:

(1) In the Colorado River District, the Southern District, and New Hogan, San Antonio and Santa Margarita lakes.

(A) Limit: Ten.

(B) Minimum size: No size limit.

(2) All other non-anadromous waters, lakes and/or reservoirs not mentioned in Section 5.75(d)(1)

(A) Limit: Two

(B) Minimum size: 18 inches total length

(e) For the purpose of these regulations, any striped bass hybrid with white bass is considered to be striped bass.

NOTE: Authority cited: Sections 200, 205, 265 and 270, Fish and Game Code.

Reference: Sections 110, 200, 205 and 265, Fish and Game Code.

Subsection (c) of Section 27.85, Title 14, CCR, is amended to read:

**§ 27.85. Striped Bass.**

(a) Open season: All year.

(b) Limit: Two.

(c) ~~Minimum~~ Harvest size limits:

(1) North of Pt. Conception, ~~18 inches total length.~~ no fish less than 18 inches total length or greater than 30 inches total length may be taken or possessed.

(2) South of Pt. Conception, no ~~minimum~~ harvest-size limit.

(d) Methods of take: No striped bass may be taken while using a sinker weighing over four pounds, or while using any power driven gurdy or winch. Striped bass may only be taken by angling as defined in Section 1.05, Title 14, CCR, spearfishing pursuant to Section 1.76, and bow and arrow fishing tackle; snagging is an illegal method of take.

NOTE: Authority cited: Sections 200, 205, 265 and 275, Fish and Game Code.

Reference: Sections 110, 200 and 205, Fish and Game Code.

**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

Draft Document

STD. 399 (Rev. 10/2019)

**ECONOMIC IMPACT STATEMENT**

|                                                                                                                                                          |                                        |                                        |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------|-----------------------------------------|
| DEPARTMENT NAME<br><b>Fish and Game Commission</b>                                                                                                       | CONTACT PERSON<br><b>David Thesell</b> | EMAIL ADDRESS<br><b>fgc@fgc.ca.gov</b> | TELEPHONE NUMBER<br><b>916 902-9291</b> |
| DESCRIPTIVE TITLE FROM NOTICE REGISTER OR FORM 400<br><b>Amend Sections 5.75(c) and (d), and 27.85(c), T.14 CCR re: Striped Bass Harvest Size Limits</b> |                                        |                                        | NOTICE FILE NUMBER<br><b>Z</b>          |

**A. ESTIMATED PRIVATE SECTOR COST IMPACTS** *Include calculations and assumptions in the rulemaking record.*

1. Check the appropriate box(es) below to indicate whether this regulation:

- |                                                                |                                                                           |
|----------------------------------------------------------------|---------------------------------------------------------------------------|
| <input type="checkbox"/> a. Impacts business and/or employees  | <input type="checkbox"/> e. Imposes reporting requirements                |
| <input type="checkbox"/> b. Impacts small businesses           | <input type="checkbox"/> f. Imposes prescriptive instead of performance   |
| <input type="checkbox"/> c. Impacts jobs or occupations        | <input type="checkbox"/> g. Impacts individuals                           |
| <input type="checkbox"/> d. Impacts California competitiveness | <input checked="" type="checkbox"/> h. None of the above (Explain below): |

**No new private sector costs are incurred, only affects size limits with no change to take limits.**

***If any box in Items 1 a through g is checked, complete this Economic Impact Statement.***

***If box in Item 1.h. is checked, complete the Fiscal Impact Statement as appropriate.***

2. The \_\_\_\_\_ estimates that the economic impact of this regulation (which includes the fiscal impact) is:  
(Agency/Department)

- ☐ Below \$10 million
- ☐ Between \$10 and \$25 million
- ☐ Between \$25 and \$50 million
- ☐ Over \$50 million *[If the economic impact is over \$50 million, agencies are required to submit a [Standardized Regulatory Impact Assessment](#) as specified in Government Code Section 11346.3(c)]*

3. Enter the total number of businesses impacted: \_\_\_\_\_

Describe the types of businesses (Include nonprofits): \_\_\_\_\_

Enter the number or percentage of total businesses impacted that are small businesses: \_\_\_\_\_

4. Enter the number of businesses that will be created: \_\_\_\_\_ eliminated: \_\_\_\_\_

Explain: \_\_\_\_\_

5. Indicate the geographic extent of impacts: ☐ Statewide  
☐ Local or regional (List areas): \_\_\_\_\_

6. Enter the number of jobs created: \_\_\_\_\_ and eliminated: \_\_\_\_\_

Describe the types of jobs or occupations impacted: \_\_\_\_\_

7. Will the regulation affect the ability of California businesses to compete with other states by making it more costly to produce goods or services here? ☐ YES ☐ NO

If YES, explain briefly: \_\_\_\_\_

**ECONOMIC AND FISCAL IMPACT STATEMENT  
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**ECONOMIC IMPACT STATEMENT (CONTINUED)****B. ESTIMATED COSTS** *Include calculations and assumptions in the rulemaking record.*

1. What are the total statewide dollar costs that businesses and individuals may incur to comply with this regulation over its lifetime? \$ \_\_\_\_\_

a. Initial costs for a small business: \$ \_\_\_\_\_ Annual ongoing costs: \$ \_\_\_\_\_ Years: \_\_\_\_\_

b. Initial costs for a typical business: \$ \_\_\_\_\_ Annual ongoing costs: \$ \_\_\_\_\_ Years: \_\_\_\_\_

c. Initial costs for an individual: \$ \_\_\_\_\_ Annual ongoing costs: \$ \_\_\_\_\_ Years: \_\_\_\_\_

d. Describe other economic costs that may occur: \_\_\_\_\_

2. If multiple industries are impacted, enter the share of total costs for each industry: \_\_\_\_\_

3. If the regulation imposes reporting requirements, enter the annual costs a typical business may incur to comply with these requirements.  
*Include the dollar costs to do programming, record keeping, reporting, and other paperwork, whether or not the paperwork must be submitted.* \$ \_\_\_\_\_4. Will this regulation directly impact housing costs? ☐ YES ☐ NO

If YES, enter the annual dollar cost per housing unit: \$ \_\_\_\_\_

Number of units: \_\_\_\_\_

5. Are there comparable Federal regulations? ☐ YES ☐ NO

Explain the need for State regulation given the existence or absence of Federal regulations: \_\_\_\_\_

Enter any additional costs to businesses and/or individuals that may be due to State - Federal differences: \$ \_\_\_\_\_

**C. ESTIMATED BENEFITS** *Estimation of the dollar value of benefits is not specifically required by rulemaking law, but encouraged.*

1. Briefly summarize the benefits of the regulation, which may include among others, the health and welfare of California residents, worker safety and the State's environment: \_\_\_\_\_

2. Are the benefits the result of: ☐ specific statutory requirements, or ☐ goals developed by the agency based on broad statutory authority?

Explain: \_\_\_\_\_

3. What are the total statewide benefits from this regulation over its lifetime? \$ \_\_\_\_\_

4. Briefly describe any expansion of businesses currently doing business within the State of California that would result from this regulation: \_\_\_\_\_

**D. ALTERNATIVES TO THE REGULATION** *Include calculations and assumptions in the rulemaking record. Estimation of the dollar value of benefits is not specifically required by rulemaking law, but encouraged.*

1. List alternatives considered and describe them below. If no alternatives were considered, explain why not: \_\_\_\_\_

**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

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**ECONOMIC IMPACT STATEMENT (CONTINUED)**

2. Summarize the total statewide costs and benefits from this regulation and each alternative considered:

Regulation: Benefit: \$ \_\_\_\_\_ Cost: \$ \_\_\_\_\_

Alternative 1: Benefit: \$ \_\_\_\_\_ Cost: \$ \_\_\_\_\_

Alternative 2: Benefit: \$ \_\_\_\_\_ Cost: \$ \_\_\_\_\_

3. Briefly discuss any quantification issues that are relevant to a comparison of estimated costs and benefits for this regulation or alternatives: \_\_\_\_\_  
\_\_\_\_\_4. Rulemaking law requires agencies to consider performance standards as an alternative, if a regulation mandates the use of specific technologies or equipment, or prescribes specific actions or procedures. Were performance standards considered to lower compliance costs? ☐ YES ☐ NOExplain: \_\_\_\_\_  
\_\_\_\_\_**E. MAJOR REGULATIONS** *Include calculations and assumptions in the rulemaking record.****California Environmental Protection Agency (Cal/EPA) boards, offices and departments are required to submit the following (per Health and Safety Code section 57005). Otherwise, skip to E4.***1. Will the estimated costs of this regulation to California business enterprises **exceed \$10 million**? ☐ YES ☐ NO***If YES, complete E2. and E3******If NO, skip to E4***

2. Briefly describe each alternative, or combination of alternatives, for which a cost-effectiveness analysis was performed:

Alternative 1: \_\_\_\_\_

Alternative 2: \_\_\_\_\_

*(Attach additional pages for other alternatives)*

3. For the regulation, and each alternative just described, enter the estimated total cost and overall cost-effectiveness ratio:

Regulation: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

Alternative 1: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

Alternative 2: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

4. Will the regulation subject to OAL review have an estimated economic impact to business enterprises and individuals located in or doing business in California exceeding \$50 million in any 12-month period between the date the major regulation is estimated to be filed with the Secretary of State through 12 months after the major regulation is estimated to be fully implemented?

☐ YES ☒ NO*If YES, agencies are required to submit a [Standardized Regulatory Impact Assessment \(SRIA\)](#) as specified in Government Code Section 11346.3(c) and to include the SRIA in the Initial Statement of Reasons.*

5. Briefly describe the following:

The increase or decrease of investment in the State: \_\_\_\_\_  
\_\_\_\_\_The incentive for innovation in products, materials or processes: \_\_\_\_\_  
\_\_\_\_\_The benefits of the regulations, including, but not limited to, benefits to the health, safety, and welfare of California residents, worker safety, and the state's environment and quality of life, among any other benefits identified by the agency: \_\_\_\_\_  
\_\_\_\_\_



**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

STD. 399 (Rev. 10/2019)

[Draft Document](#)**FISCAL IMPACT STATEMENT****A. FISCAL EFFECT ON LOCAL GOVERNMENT** *Indicate appropriate boxes 1 through 6 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*

- ☐ 1. Additional expenditures in the current State Fiscal Year which are reimbursable by the State. (Approximate)  
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

\$ \_\_\_\_\_

- ☐ a. Funding provided in \_\_\_\_\_  
Budget Act of \_\_\_\_\_ or Chapter \_\_\_\_\_, Statutes of \_\_\_\_\_

- ☐ b. Funding will be requested in the Governor's Budget Act of \_\_\_\_\_  
Fiscal Year: \_\_\_\_\_

- ☐ 2. Additional expenditures in the current State Fiscal Year which are NOT reimbursable by the State. (Approximate)  
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

\$ \_\_\_\_\_

*Check reason(s) this regulation is not reimbursable and provide the appropriate information:*

- ☐ a. Implements the Federal mandate contained in \_\_\_\_\_
- ☐ b. Implements the court mandate set forth by the \_\_\_\_\_ Court.

Case of: \_\_\_\_\_ vs. \_\_\_\_\_

- ☐ c. Implements a mandate of the people of this State expressed in their approval of Proposition No. \_\_\_\_\_

Date of Election: \_\_\_\_\_

- ☐ d. Issued only in response to a specific request from affected local entity(s).

Local entity(s) affected: \_\_\_\_\_  
\_\_\_\_\_

- ☐ e. Will be fully financed from the fees, revenue, etc. from: \_\_\_\_\_

Authorized by Section: \_\_\_\_\_ of the \_\_\_\_\_ Code;

- ☐ f. Provides for savings to each affected unit of local government which will, at a minimum, offset any additional costs to each;

- ☐ g. Creates, eliminates, or changes the penalty for a new crime or infraction contained in \_\_\_\_\_

- ☐ 3. Annual Savings. (approximate)

\$ \_\_\_\_\_

- ☐ 4. No additional costs or savings. This regulation makes only technical, non-substantive or clarifying changes to current law regulations.

- ☒ 5. No fiscal impact exists. This regulation does not affect any local entity or program.

- ☐ 6. Other. Explain \_\_\_\_\_  
\_\_\_\_\_

**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

Draft Document

STD. 399 (Rev. 10/2019)

**FISCAL IMPACT STATEMENT (CONTINUED)****B. FISCAL EFFECT ON STATE GOVERNMENT** *Indicate appropriate boxes 1 through 4 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*☐ 1. Additional expenditures in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

*It is anticipated that State agencies will:*☐ a. Absorb these additional costs within their existing budgets and resources.☐ b. Increase the currently authorized budget level for the \_\_\_\_\_ Fiscal Year☐ 2. Savings in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

☒ 3. No fiscal impact exists. This regulation does not affect any State agency or program.☐ 4. Other. Explain \_\_\_\_\_  
\_\_\_\_\_**C. FISCAL EFFECT ON FEDERAL FUNDING OF STATE PROGRAMS** *Indicate appropriate boxes 1 through 4 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*☐ 1. Additional expenditures in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

☐ 2. Savings in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

☒ 3. No fiscal impact exists. This regulation does not affect any federally funded State agency or program.☐ 4. Other. Explain \_\_\_\_\_  
\_\_\_\_\_

FISCAL OFFICER SIGNATURE

DATE

*The signature attests that the agency has completed the STD. 399 according to the instructions in SAM sections 6601-6616, and understands the impacts of the proposed rulemaking. State boards, offices, or departments not under an Agency Secretary must have the form signed by the highest ranking official in the organization.*

AGENCY SECRETARY

DATE

*Finance approval and signature is required when SAM sections 6601-6616 require completion of Fiscal Impact Statement in the STD. 399.*

DEPARTMENT OF FINANCE PROGRAM BUDGET MANAGER

DATE



**STD. 399 Addendum****Amend Sections 5.75(c) and (d), and 27.85(c)  
Title 14, California Code of Regulations  
Re: Striped Bass Harvest Size Limits****Background**

Currently, any striped bass 18 inches or greater may be harvested within anadromous and marine waters north of Point Conception with a daily bag limit of two fish. The proposed regulation change would impose a slot limit within these waters whereby only striped bass from 18 to 30 inches total length would be available for harvest in the sport fishery, with no proposed change to the bag limit.

Striped bass are native to the East and Gulf Coasts of North America and were introduced to San Francisco Bay in 1879. A commercial fishery was established in the San Francisco Bay area by the late 1880s but closed in 1935. Prior to 1956, fishing regulations generally included a 12-inch minimum length limit (MLL) and a five fish daily bag limit. From 1956-1981 the MLL increased to 16 inches with a daily bag limit reduction to three fish. In response to declines in legal-size striped bass in the 1970's and at the request of anglers, the California legislature established a short-lived Striped Bass Management program in 1981, which included stocking striped bass in California rivers using private and state-run hatcheries. In the same year, striped bass regulations were further restricted to an 18-inch MLL and a daily bag limit of two fish, which remain in effect today.

The Striped Bass Management Plan ended in 2004 due to increases in the striped bass population and concern over the impact of striped bass predation on native fish species. In 2020, the Fish and Game Commission (the Commission) committed to sustain striped bass populations in support of a recreational fishery.

The Nor-Cal Guides and Sportsmen's Association (NCGASA) submitted a regulation change proposal to the Commission on August 1, 2022 (Tracking number [TN] 2022-12). The proposal was to change the MLL from 18 inches to 20 inches and impose a maximum size of 30 inches. The stated goals were:

- To protect the species by increasing the minimum length to allow more fish to mature and successfully spawn prior to harvest and
- To protect the larger fish that tend to be the best spawners and are becoming increasingly rare in the fishery

The Department of Fish and Wildlife (the Department) examined the necessity of the proposed changes and developed a report, California Department of Fish and Wildlife Evaluation of NCGASA Proposed 20-30 Inch Harvest Slot Limit (HSL) for Striped Bass. On September 12, 2024, the Department provided the Wildlife Resources Committee

with a presentation of the report's findings. The Department supported an 18-30-inch HSL because it would benefit anglers by creating a trophy fishery and increasing total catch.

The Department is proposing changes to the following regulations in Title 14, CCR:

- Amend Section 5.85 Striped Bass, subsection (c)
  - Add the maximum size limit of 30 inches.
  - Add reference to the section defining anadromous waters.
  - Amend text to replace references to “minimum size limit” to “harvest size limit”.
- Add Section 5.85 Striped Bass, subsection (d)2
  - Add section that specifies that in non-anadromous waters not mentioned in 5.75(d)1, a minimum size of 18 inches total length and a harvest bag limit of 2 applies.
- Amend Section 27.85 Striped Bass, subsection (c)
  - Add the maximum size limit of 30 inches.
  - Amend text to replace references to “minimum size limit” to “harvest size limit”.

## **Economic Impact Statement**

### **A. Estimated Private Sector Costs Impacts**

**Answer 1:** h. None of the above (Explain below):

The Commission is not aware of any private sector cost impacts that a representative private person or business would necessarily incur in reasonable compliance with the proposed action. The proposed changes provide changes to existing regulations regarding the size limits for taking striped bass that have the goal of expansion of the resource, without changing fishing opportunities via changes to take limits and thus, the prevention of adverse economic impacts. These changes are not anticipated to change the level of fishing activity enough to affect the demand for goods and services related to striped bass sport fishing enough to impact the demand for labor, nor induce the creation of new businesses, nor eliminate or induce the expansion of businesses in California.

## **Fiscal Impact Statement**

### **A. Fiscal Effect on Local Government**

**Answer 5.** No fiscal impact exists. This regulation does not affect any local entity or program. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution.

### **B. Fiscal Effect on State Government**

**Answer 3.** No fiscal impact exists. This regulation does not affect any State agency or program. The Department program implementation and enforcement are projected to remain the same with a stable volume of fishing activity.

**C. Fiscal Effect on Federal Funding of State Programs**

**Answer 3.** No fiscal impact exists. This regulation does not affect any federally funded State agency or program.





# PROPOSED REGULATION CHANGE FOR STRIPED BASS SLOT LIMIT PETITION



**PRESENTATION TO THE CALIFORNIA FISH AND GAME COMMISSION**

June 12, 2025 | Jonathan Nelson

Wildlife and Fisheries Division/Fisheries Branch

# Presentation Overview

- Background on Petition TN 2022–12
- Review Striped Bass Policy
- Biology of Striped Bass
- CDFW petition evaluation
- Outreach efforts
- Evaluation conclusions
- Wildlife Resources Committee Outcomes
- Recommendation
- Timeline



*Photo Credit: Erin Ferguson*

# Petition Background

- **Who** – Nor-Cal Guides and Sportsman's Association (NCGASA) submitted a petition on August 1, 2022 (TN 2022–12) proposing to implement a Striped Bass (SB) harvest slot limit (HSL) of 20-30 inches for inland anadromous and marine waters.
- **Why** - NCGASA stated goal:
  - To protect the species by increasing the minimum length to allow more fish to mature and successfully spawn prior to harvest and
  - To protect the larger fish that tend to be the most prolific spawners and are becoming increasingly rare in the fishery
  - 20–30 inches was what the majority of the SB fishing organizations and angling community contacted by NCGASA from Monterey to Yuba City were in agreement for socio economics and food for fishing families (J. Stone, NCGASA President)



# FGC Striped Bass Policy

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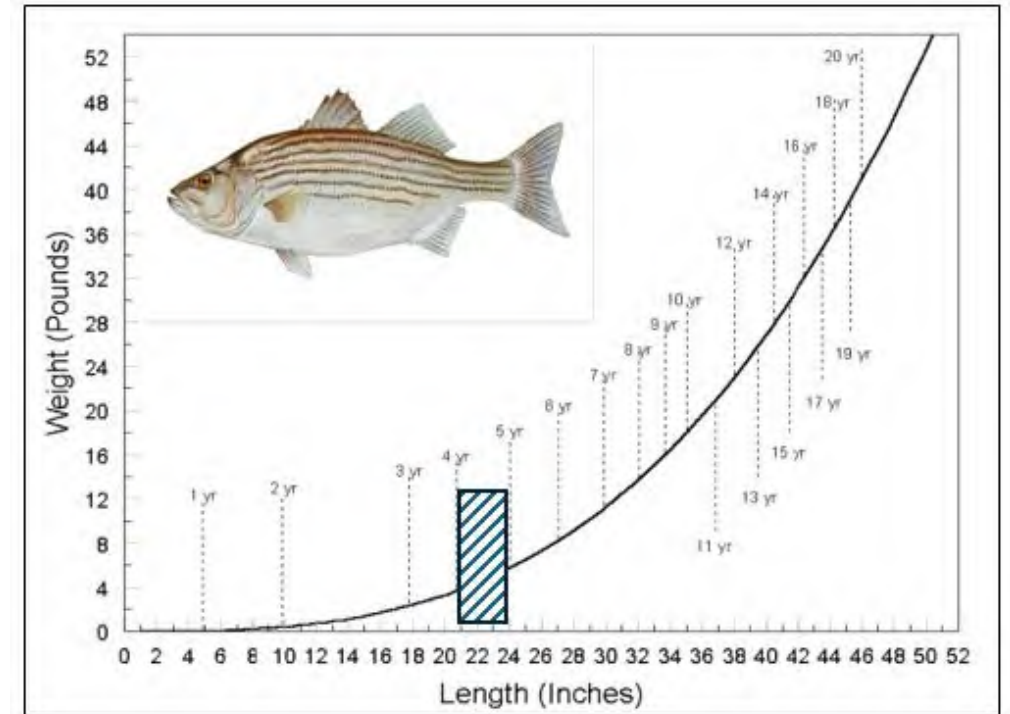
- I. The Department of Fish and Wildlife shall monitor and manage the striped bass fishery...consistent with Commission policy that **the Department emphasize programs that ensure, enhance, and prevent loss of sport fishing opportunities.**
- II. The Department shall... **strive to maintain a healthy, self-sustaining striped bass population in support of a robust recreational fishery.**  
...the Department shall work with relevant stakeholders, organizations, and the public to develop appropriate objectives to achieve these broad aims.
- III. The Department shall work toward these goals through any appropriate means. **Such means may include actions to help maintain, restore, and improve habitat beneficial to striped bass...**  
and assess the status and population of striped bass in the Delta.





# Striped Bass (*Morone saxatilis*)

- Native to East Coast, introduced into San Francisco Bay in 1879
- Anadromous
  - Utilize freshwater/marine habitats
  - Highly migratory
- Long-lived
  - Up to 30 years
- Maturation
  - Females: age 4-5 (22-24 inches)
- Broadcast spawners
- Opportunistic predators
  - Insects, fishes, crustaceans
  - Cannibalistic
- Popular Year-round Fishery
  - Ocean, bays, rivers, and lakes
  - **18-inch minimum length limit (MLL); 2 fish daily bag limit**



Wildlife.ca.gov – Striped Bass Fishing Map





# CDFW Petition Evaluation\*

- Public Input
- Population and Fishery Trends:
  - Existing fisheries monitoring data
  - Marine and Inland Creel survey data
- Population and fishery impacts of regulatory changes
- Atlantic States SB regulations
- Predation evaluation

\* Comprehensive Evaluation w/ appendices submitted to FGC as supplemental documents



*Photo Credit: Dylan Stompe*



# Tribal Outreach

- Tribal Notification Letter
  - Sent March 11, 2025
- Tribal Resources Committee
  - Update May 7, 2025
- CDFW received several requests to provide updates on progress and developments



*Photo Credit: Jeremy Taylor*



# General Public Input

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## **Angler Preference Questionnaire (July – October 2022)**

- Purpose – Better understand anglers' sentiments about the SB fishery
  - Questionnaire vetted for bias and leading language
- Distributed through email and social media
- Available in 7 languages
  - English, Spanish, Tagalog, Traditional/Simplified Chinese, Russian, Vietnamese)
- ~26,500 responses

## **Joint Public Town Hall Meeting (August 2022)**

- Purpose – Discuss proposed NCGASA petition and CDFW's evaluation plan
- Well Attended - 50 in-person and 100 virtual participants
- Majority of commenters supported the proposed petition

## **Wildlife Resources Committee Meetings (2022, 2024, 2025)**



# Questionnaire Results

## 26,410 Total responses:

- 18,751 respondents fish for SB
- 7,659 did not fish for SB

## Brief results:

- 71% support current minimum length limit (MLL)
- If given the option
  - 54% would not change the MLL
  - 28% would either lower or have no limit
- Trophy fish
  - 64% in favor of catch-and-release trophy fishery
  - Variable sizes proposed:
    - 30 inches (26%)
    - 36 inches (15%)
    - $\geq 40$  inches (21%)



*Photo Credit: Shawn Simkins*



# SB Population Trends

- There is limited monitoring data for SB in CA, restricting the Department's ability to accurately estimate population and size class abundance
- Juvenile abundance monitoring has shown a declining trend in recruitment
- Adult abundance estimates have declined from historic estimates but appear to have stabilized at considerably lower levels over the past few decades
- Primary source of adult data is derived from recreational angler data collected in our Marine and Inland Creel programs.
  - Fishery metrics such as effort, catch, harvest, and size of the catch can be estimated;
  - However, size ranges observed in the fishery may not be reflective of size class distribution or abundance in the population





# SB Fishery Trends

1991-2022 Creel Data (fishery dependent surveys)

- Angling effort targeting Striped Bass **has not** significantly changed
- Catch and Catch-per-unit-effort (CPUE, Fig. a) **have** significantly increased
- Harvest **has not** significantly changed over time
- Number of SB released over time **has** significantly increased
- Mean size of SB harvested **has not** significantly changed (~23 in; Fig. b)

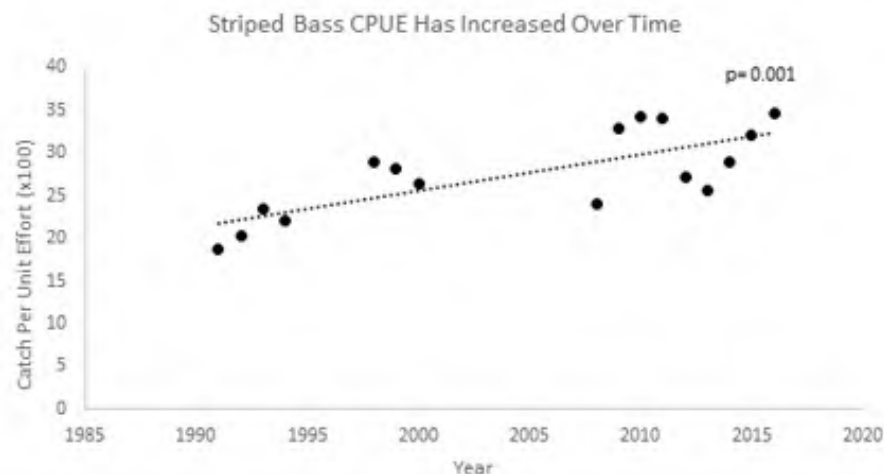


Figure a

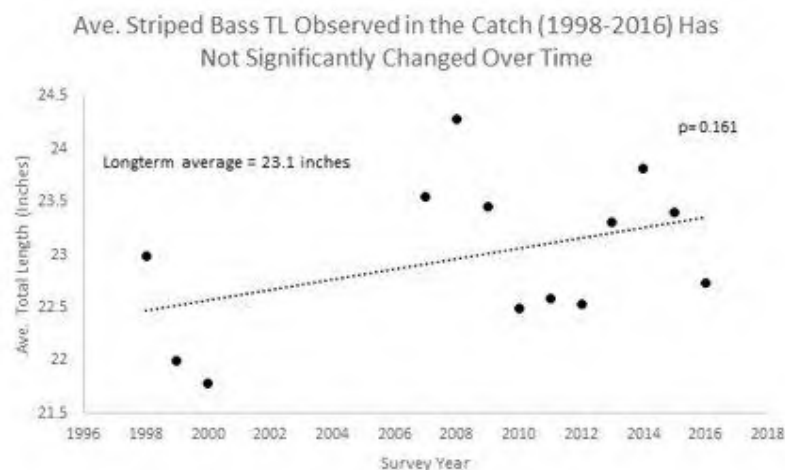


Figure b



# Slot Limit Comparison

**Approach:** Evaluated how the following metrics would change in response to implementing a 20-30-inch HSL (proposed), 18-30-inch HSL (alternative), or 28-35-inch HSL (conservative) regulation:

- Stock Conservation:
  - Probability of recruitment overfishing
  - Proportion of fecundity contribution from older females (>10 years)
- Fishery:
  - Total catch, total harvest, and trophy-size (> 30 inches) catch

**Data:** Input parameter data informed by multiple data sources, published values, and life-history theory



# Benefits of 18-30-inch HSL

---

- The model evaluation concluded that an 18-30-inch HSL would provide the best balance between angler opportunity and biological benefits
- Probability of recruitment overfishing decreased compared to the 18-inch MLL
- Reproductive contributions from older (thus larger) females increase
- Predicted increase in both overall and trophy catch
- Many anglers already report catch-and-release practice for large SB
- 64% of questionnaire respondents were in favor of a catch-and-release trophy fishery



# Uncertainties and Additional Considerations

- Based on the details outlined in the evaluation, it is unknown how environmental conditions (flow, temperature, water quality, etc.) constrain SB population growth
- Implementing a slot limit will also apply to spear fishing regulations, which may result in illegal take and mortality of SB >30 inches
- Lack of funding prevents current SB adult population monitoring to measure the effectiveness or impact of a regulation change



*Photo Credit: Wildlife.ca.gov*



# WRC Outcomes

- CDFW presented an overview of the petition evaluation at the September 12, 2024 WRC meeting
- CDFW recommended either “no change” or could support an 18-30-inch HSL
- NCGASA, associated SB groups, and science advisor confirmed support of the 18-30-inch slot limit as recommended by CDFW
- WRC recommended moving an 18-30-inch proposal for discussion with the Fish and Game Commission



Photo Credit: Central Valley Angler Survey





# Recommendation

- **Proposed Regulation Change**

- 18-30-inch harvest slot limit
- Season - All year (current), Daily bag limit – 2 fish (current)
- No changes to methods of take outlined in T14 CCR § 7.00, § 7.40, § 7.50 (Inland) and T14 CCR § 27.85 (Ocean)
  - Includes spearfishing outlined in T14 CCR § 2.30 (Inland) and T14 CCR § 1.76 (Ocean)

- **Geographic Range Includes:**

- Central Valley and Coastal Anadromous Waters and Ocean, Bays and Estuaries north of Point Conception

- **Excludes:**

- Non-anadromous inland Lakes, Reservoirs, streams/rivers, including CV Aquaduct and Ocean, Bays and Estuaries south of Point Conception



# Timeline

- Notice – June 12, 2025
- Discussion – August 13, 2025
- Adoption – October 8, 2025



*Photo Credit: Dylan Stompe*



# Questions | Contact



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*Photo Credit: Central Valley Angler Survey*



**Department Report *and* Appendices**

**California Department of Fish and Wildlife Evaluation of  
Regulation Change Petition 2022-12: Proposed 20–30–Inch  
Harvest Slot Limit for Striped Bass (*Morone saxatilis*)**

**CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE  
EVALUATION OF REGULATION CHANGE PETITION 2022–12:  
PROPOSED 20–30–INCH HARVEST SLOT LIMIT FOR STRIPED  
BASS (*MORONE SAXATILIS*)**

Petition submitted August 1, 2022 by Nor-Cal Guides and Sportsmen's  
Association (NCGASA)

*Report prepared by:*

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*July 26, 2024*



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## **Acknowledgements**

We would like to acknowledge the invaluable intellectual contribution of Dr. Daniel Gwinn to the population modeling conducted in this evaluation. Additionally, we would like to thank John Kelly, Jim Hobbs, Dan Kratville, Steve Tsao, Kristen Ramey and Jay Rowan for their input, reviews, and contributions to the content of this evaluation.

## **Striped Bass Fishery Background**

Native to the East and Gulf Coasts of North America, Striped Bass (*Morone saxatilis*) were introduced to Pacific waters in 1879 when 132 individuals were planted in San Francisco Bay (Scofield 1930). After one additional fish transfer in 1882 (Smith 1895), a commercial fishery was established in the San Francisco Bay area by the late 1880s (Hart 1973). To protect the increasingly popular sport fishery, the commercial Striped Bass fishery closed in 1935. Prior to 1956, fishing regulations generally included a 12-inch minimum length limit (MLL) and a five fish daily bag limit. From 1956–1981 the MLL increased to 16 inches with a daily bag limit reduction to three fish (Stevens and Kohlhorst 2001). In response to declines in legal-size Striped Bass in the 1970's (Kohlhorst 1999) and at the request of anglers, the California legislature established a short-lived Striped Bass Management program in 1981, which included stocking Striped Bass in California rivers using private and state-run hatcheries. In the same year, Striped Bass regulations were further restricted to an 18-inch MLL and a daily bag limit of two fish, (14 CCR 5.75; 14 CCR 27.85) which remain in effect today.

The Striped Bass Management Plan was terminated in 2004 due to observed increases in the Striped Bass population and growing concern over the impact of Striped Bass predation on native fish species (SB 692, 2003). In 2020, the Fish and Game Commission unanimously adopted an amendment to the Striped Bass policy that eliminated a numeric target for population size and replaced it with a broader commitment to sustain Striped Bass populations in support of a robust and self-sustaining recreational fishery (FGC 2020).

## **Summary of Proposed Regulation Change Petition**

The Nor-Cal Guides and Sportsmen's Association (NCGASA) submitted a regulation change proposal to the Fish and Game Commission on August 1, 2022 (Tracking number [TN] 2022–12). The proposed regulation change would impose a slot limit within anadromous and marine waters whereby only Striped Bass from 20 to 30 inches would be available for harvest in the sport fishery, with no proposed change to the bag limit. Currently, any Striped Bass 18 inches or greater may be harvested within anadromous and marine waters with a daily bag limit of two fish. The NCGASA-proposed Striped Bass regulation change did not consider or propose any changes to the current bag limit, season, or geographic range.

The NCGASA stated need for the proposed shift from 18 to 20-inch minimum harvest length:

*"This will allow more opportunity (at least one more year) for females to spawn after initial maturity (which is around 18 inches). It would also protect any unripe Striped Bass (male or female) that fall between 18 to 20 inches from harvest."* (M. Smith, personal communication, November 1, 2022).

The NCGASA stated need for the proposed 30-inch maximum harvest length:

*"This will allow protection to the most fecund female spawners and contributes to increased spawning success of the population."* (M. Smith, personal communication, November 1, 2022).

### **Communication between NCGASA and the California Department of Fish and Wildlife (Department)**

Since petition TN 2022-12 was submitted, the Department has met with NCGASA and their scientific advisors multiple times. The meetings and email correspondences helped to clarify desired short- and long-term Striped Bass fishery outcomes and share available data so that the Department could fairly and accurately evaluate the contents of the petition on its face, as well as the intent of the petitioner. Through those discussions the Department also tracked these additional comments from the petitioner.

#### Additional comments from NCGASA:

- *"The Striped Bass population is in desperate trouble at each life stage. The population is collapsing and is no longer viable," (Page 2, TN 2022–12).*
- *"Current regulations allow for the removal of female Striped Bass before they reach sexual maturity as well as removal of the largest females from the system," (Page 3, TN 2022–12).*
- *"20 inches may not be ideal for protecting reproductive females (that would be 24 or 26 inches) but it is an initial starting point that balances at least one more year toward maturity and maintains recreational angler opportunity. We are open to adjusting the lower slot upwards in a phased approach as populations sizes gradually increase."* (M. Smith, personal communication, November 1, 2022).

- *“20–30 inches was what the majority of the Striped Bass fishing organizations and angling community contacted by NCGASA from Monterey to Yuba City were in agreement to for socio economics and food for fishing families.” (J. Stone, personal communication, November 1, 2022).*

## Evaluation Summary

The Department received and evaluated a regulation change petition (TN 2022–12), whereby if implemented, would impose a Harvest Slot Limit (HSL) of 20–30 inches on Striped Bass in marine and anadromous waters. The Department evaluated if the Striped Bass population warrants further protection through changes to current angling regulations, and if the proposed HSL would produce the biological and fisheries improvements desired by the petitioners.

Within Striped Bass native ranges, Atlantic states have adopted various combinations of regulatory practices to meet their management goals (Figure 15, ASMFC 2022). Examples include various harvest slot ranges, split slot limits, seasonal and geographic regulations, changes to bag limits, gear restrictions, and others. The petition only requested a specific HSL and did not include alternative HSL options or other considerations such as changes to season, bag limit, or geographic range; therefore the Department's evaluation is focused on the proposed 20–30–inch HSL and does not include evaluation of these other factors. The Department gathered available data from inland and marine creel surveys, juvenile and adult abundance surveys, and a Striped Bass Angler Preference Questionnaire. Additionally, modeled population and fishery responses under the current 18–inch MLL regulation were compared to the proposed 20–30–inch HSL and an alternative 18–30–inch HSL that maintains the current 18–inch MLL.

**The Department could support a regulation change for Striped Bass, including a HSL, if it were determined that the population warranted further regulatory protections or that regulatory protections would improve the angler experience.**

Harvest slot limits can provide effective population and fisheries benefits such as increased productivity, population growth, reduced overfishing, and trophy fisheries. Harvest slot limits are best determined using species–specific biological



metrics, population dynamics, consideration of environmental influences, impacts to fisheries participants, and management goals and objectives.

Relative to the current MLL, a HSL is estimated to decrease the risk of recruitment overfishing, defined as exploitation at a rate beyond stock replacement (Goodyear 1980, Mace and Sissenwine 1993) (Figure 13a). Therefore, implementation of an HSL may result in increased Striped Bass population growth if carrying capacity is not constrained. Population model simulations resulted in a 53% probability of recruitment overfishing (i.e., probability of a spawner potential ratio [SPR] < 0.35; Figure 13a) under the current 18-inch MLL, suggesting that the current regulation may not be adequate for long-term population sustainability and growth. Under an 18–30-inch and 20–30-inch HSL, model simulations resulted in a decreased risk of recruitment overfishing by 14% and 19%, respectively (Figure 13a), indicating that a harvest slot may improve recruitment success.

Population model simulations resulted in a higher proportion of fecundity contribution from older (age 10+) females under HSLs compared to the current MLL (Figure 13b), which may have positive implications on recruitment for Striped Bass. However, there was *no difference* in this metric between the 18–30-inch HSL and the 20–30-inch HSL. Thus, it is unlikely that raising the lower limit from 18 to 20-inch (while maintaining the 30-inch upper limit) will have substantial impacts on reproductive output.

Relative to the current MLL, the evaluated 18–30 inch and 20–30-inch HSL regulations resulted in similar improvements to catch and trophy-sized catch (Figure 13e-f), but harvest was substantially lower under the 20–30-inch slot (21%; Figure 13d). Population model simulations resulted in 13% lower harvest under the proposed 20–30-inch HSL compared to the 18–30-inch HSL.

Prioritizing harvest numbers above other fishery objectives (e.g., increased catch, size of catch, fishing opportunities, angler satisfaction, etc.) is best supported by the current 18-inch MLL or implementing a wide harvest slot that encompasses the majority of sizes that are vulnerable to catch modeled for the recreational fishery. If the management objective is to enhance recreational fishing opportunities in the form of catch numbers, HSLs better achieve this goal compared to the current MLL. Possibly the most realized benefit of HSLs in terms of catch comes in the form of catch size, as HSLs produced substantially higher numbers of trophy-sized catch compared to the current MLL (Figure 13f). Thus, HSLs can provide multiple benefits to the angler experience, including higher catch rates and improved quality of catch (as defined by fish size). If the fishery objective is to be more protective and increase spawning opportunity, then the HSL needs to be set to minimize harvest of the most abundant spawning size classes, which will inherently decrease harvest opportunity.

As stated above, the focus of this evaluation was to determine if (1) the population warrants further protection through changes to current angling regulations and (2) to assess if the proposed HSL would produce the biological and fisheries improvements desired by the petitioners. While the Department is in support of an HSL for the Striped Bass fishery as a concept, available monitoring data suggest that the adult population is relatively stable and further protections to the population in the form of regulatory changes may not be warranted at this time; however, regulatory changes in the form of a slot limit could enhance recreational fishing opportunities in both catch numbers and catch size.

**Declines in recruitment to age-0 in the Delta (Figure 8) suggests some level of reduced spawning and/or recruitment success, though recent abundance estimates (2011–2016) imply relative stability in the adult (> 18 inches TL) population.**

Recent abundance estimates calculated using the combined inland and marine harvest estimated from the Central Valley Angler Survey (CVAS) and the California Recreational Fisheries Survey (CRFS) creel surveys, as well as harvest rate from tag returns, resulted in an average of 1,157,275 legal-sized (> 18–inches TL) Striped Bass estimated from 2011–2016. Relative measures of angler catch/harvest of adult Striped Bass collected in the CVAS also suggest stability in the adult (> 18 inches) population. Angler effort targeting Striped Bass has not significantly changed during 1991–2016, however, angler catch-per-unit-effort (CPUE) has increased significantly over the same period (Figure 2). Data collected from Commercial Passenger Fishing Vessels (CPFV) during 1995–2020

also indicate that CPUE has significantly increased over time (Figure 3). The average size of Striped Bass harvested by anglers has not changed significantly over time (Figure 5). However, length data on fish released was not historically recorded, and thus it is possible that the size of fish released in the fishery has changed over time.

Despite evidence of stability in the adult population, the Department is not opposed to implementing a HSL to benefit the angling experience. However, our evaluation has concluded that a 20–30-inch HSL, as proposed by petitioners, may not be adequate in meeting the petitioner's stated fishery and population objectives.

**The Department does not support increasing the MLL from 18 to 20 inches because it would likely not produce the biological or fisheries responses described in the petition.**

One of the stated desires of the petitioners is to protect the earliest spawners. The Department has determined that increasing the current MLL from 18 to 20 inches fails to provide sufficient protections to sexually mature female Striped Bass and would not provide the fisheries response sought. The potential for increased population fecundity contributed by mature females between 18 and 20 inches is negligible based on the percentage of female maturity in that size and age range. Females are roughly 3 years old at 18–20 inches. Literature on the fecundity and maturity of Striped Bass on the West Coast suggests that most females mature between ages 4 and 5 when they are around 22–24 inches, and nearly all females are mature by age 6 when they are approximately 27 inches (Collins 1982, Raney 1989, Scofield 1930). In Atlantic stocks, recent studies have found less than 10% of individuals mature at age 3 (Brown et al. 2024), and stock assessments for Atlantic Striped Bass use a sexual maturity of 0% for age–3 females in population models (ASMFC 2014, ASMFC 2022).

To incorporate natural variation in age-at-maturation in our population model of West Coast Striped Bass, we set the mean length at maturation for females at 22.8 inches with a 95% probability between ~ 20–26 inches (Appendix A2f). There was no difference in the proportion of fecundity contributed by older females when comparing the model simulations between the proposed 20–30-inch HSL inch to the alternative 18–30-inch HSL (Fig. 13b). In other words, increasing the lower limit from 18 to 20 inches does not translate into an increase in egg contribution by older fish. This is important for population persistence considering energy investment into individual offspring changes with female size, such that

larger fish produce offspring that are greater in size and number compared to smaller fish (Lim et al. 2014). This can have implications on recruitment success, as larger offspring are less vulnerable to size-dependent mortality and therefore typically experience higher survival rates (Conover and Schultz 1997). The difference in the probability of recruitment overfishing (probability of  $SPR < 0.35$ ) under an 18–30-inch HSL vs 20–30-inch HSL was relatively small (5%; Figure 13a), suggesting that recruitment gains under each lower limit are similar.

It is estimated that harvest would decrease by 21% under a 20–30-inch HSL compared to the current 18-inch MLL (Fig. 13d). This may have an outsized impact on disadvantaged communities that utilize Striped Bass for sustenance. Additionally, increasing the MLL to 20 inches is not supported by the angling public contacted through an electronic questionnaire distributed by CDFW ( $n = 18,751$ ). The Striped Bass Angler Preference Questionnaire indicated that 71% supported the current 18-inch MLL. Data from inland and marine creel surveys indicate that Striped Bass CPUE, size of the catch, and harvest have been stable for decades, and both fisheries have seen an increase in the number of released Striped Bass.

Increasing the MLL from 18 to 20 inches will likely minimize potential population benefits due to an increase in discard mortality. Discard mortality (i.e., release mortality) can be high (Table 2.3), especially during unfavorable environmental conditions such as elevated water temperatures, which are common as climate change increases the severity and frequency of drought conditions in California. Discard mortality rates for California Striped Bass fisheries are not currently monitored; however, the Department's Central Valley Angler Survey qualitatively observes an increase in moribund Striped Bass during late-spring through summer when water temperatures are elevated. Mortality rates of discarded Striped Bass are well documented in Atlantic Coast recreational fisheries (see Appendix 2.1.2).

**CDFW is supportive of an upper HSL to support a trophy fishery but has not determined if 30 inches is the most appropriate size.**

The upper 30-inch HSL proposed by the petitioner was not determined based on biological evidence or supporting scientific data, but instead informed by angler preference in the Striped Bass fishing organizations and angling communities contacted by petitioners. The narrow focus of the current evaluation precluded additional analysis of what the most biologically appropriate HSL, or combination of regulatory strategies (as observed in the East Coast regulations), would be best to meet the goals of both the Department and the petitioners.

While it would be prudent to compare additional HSLs, the Department could support an upper HSL of 30 inches (as proposed by petitioners) to create opportunity for a trophy fishery. Results from the Striped Bass Angler Preference Questionnaire indicate that 63% of respondents were supportive of a catch-and-release trophy Striped Bass fishery. 'Trophy' size was also defined as  $\geq 30$  inches by most respondents in that survey). Based on the creel surveys, a 30-inch upper HSL would likely not have substantial impacts on harvest patterns. Creel data indicate that reported harvest of fish  $> 30$  inches is low and many anglers informally report to creel clerks that they currently release larger fish for various reasons. Based on model results, implementing an upper slot limit of 30 inches with the current 18-inch MLL only decreased estimated harvest by approximately 8% (Figure 13d).

In concept, an upper HSL of 30 inches could be more protective of the female spawning biomass and may contribute to increased recruitment. Model simulations resulted in an 8.1% increase in the proportion of fecundity contributed by older fish under both evaluated HSLs (20-30 and 18-30 inch) compared to the current 18-inch MLL (Fig. 12b). However, a number of factors could minimize the expected recruitment response resulting from a 30-inch HSL. Anglers harvest a very low proportion of  $> 30$ -inch fish ( $< 6\%$ ; Figure 6 and Figure 7), and the Department lacks the data necessary to determine if this observation is driven by (1) anglers choosing to release larger fish, (2) low abundance of  $> 30$ -inch fish in the population, (3) larger fish being less vulnerable to catch in the fishery (see Appendix section 2.1.3), or (4) a combination of these factors.



Decreasing the upper slot limit (< 30 inches) may be necessary to be more protective of the greatest proportion of the female spawning biomass. Regardless, for significant spawning and recruitment gains to be realized, the benefit would likely come at the cost of harvest opportunity. With these considerations in mind, additional analysis would be necessary to determine if 30 inches is the most efficient upper HSL in terms of maximizing stock conservation gains while minimizing impacts to the fishery (i.e., loss of catch or harvest opportunity).

**Implementation of a harvest slot may necessitate removal of spearfishing as a method of take for Striped Bass.**

It is common to allow spearfishing for fish species with MLLs based on the assumption that anglers can visually estimate if a fish is larger than the minimum size. It becomes extremely difficult, if not impossible, for an angler to accurately visually estimate the size of a fish that has a minimum and maximum size limit. In addition, the lethal nature of a speargun would make it impossible to release a fish in good condition if outside the harvest slot. This can result in illegal harvest if retained and put the angler at risk; or the angler releases a moribund fish that can no longer contribute to future spawning and catch, which is counter to the purpose of the HSL. Additionally, the release of a moribund fish is considered wanton waste of fish by definition in regulation. California currently does not allow spearfishing take for any species with a harvest slot limit, however, a few regions on the East Coast allow take by spear where Striped Bass have slot limits (Figure 15).

**Based on available data in California, there is insufficient evidence to support that Striped Bass predation is a primary contributor to declining salmonid and smelt populations.**

Observations of salmonids in Striped Bass stomachs vary by life stage and season, but overall remains relatively low (Stevens 1966, Michel et al. 2018, Stompe et al. 2020, Peterson et al. 2020, Brandl et al. 2021). An extensive review of literature pertaining to Striped Bass predation in the Sacramento– San Joaquin River Delta suggests that sub–adult size classes are more likely to encounter and consume native fish due to their longer Delta and freshwater residency and more optimal predator–to–prey ratio (PPR) (see Appendix 3).

While older (larger) Striped Bass consume more prey on an individual basis, total consumption is often greater for sub-adults compared to adults due to a higher abundance of younger (smaller) fish (Loboschewsky et al. 2012). It is likely that smaller sub-adult Striped Bass (ages 1 and 2) that are present year-round and have a wide geographic distribution in the Delta and Central Valley rivers have more opportunity to contact native fish species. A shift in MLL from 18 to 20 inches may contribute to an increase or shift in predation habits for Striped Bass between 18 and 20 inches.

The majority of larger Striped Bass (> 21 inches, Dorazio et al. 1994) are migratory, spend less time in the freshwater environment, and are less likely to target smaller sized prey due to PPR. There may also be a contingent of large Striped Bass that are freshwater residents, posing some constant, yet unquantified, level of predation pressure. Establishing an upper HSL at 30 inches will not likely have a noticeable impact on predation of juvenile salmonids and smelt due to (1) PPR, (2) high variation in the size of prey consumed, and (3) little evidence of prey specialization.

### **Department Recommendation**

The Department does not recommend a 20–30–inch HSL as proposed in the petition. The Department recommends maintaining the current 18–inch MLL regulation and is supportive of establishing an upper HSL. Modeling suggests a 30-inch upper limit could result in decreased risk of recruitment overfishing (and thus stock conservation benefits) and increased catch and trophy fishing opportunity, but it cannot confirm if 30 inches is the most appropriate size due to the narrow scope of the current analysis. While there is public support for maintaining the 18–inch MLL (71% of respondents) and establishing a catch-and-release trophy fishery (64% of respondents), the highest percentage of respondents supported no change in harvest regulations (54% of respondents) in the Striped Bass Angler Preference Questionnaire. Creel data suggest that the Striped Bass fishery in California is currently stable, and the current regulations are not contributing to perceived population declines; however, modeling results suggest that the current 18-inch MLL on its own may not be adequate for long-term population stability and growth.

The Department will continue to support harvest opportunity for anglers as long as the available data reflect trends that are in line with the guidance laid out in the Fish and Game Commission Striped Bass Policy. In the absence of additional funding, monitoring, and staffing that would be necessary to conduct a more comprehensive, multifaceted approach to determine the most effective angling regulation, the Department believes there could be some benefit to the Striped Bass fishery by implementing a HSL and could support a HSL of 18-30 inches.

## **Scientific Evaluation of Striped Bass Fishery**

Evaluation of the health and performance of a fishery includes understanding angler usage and participation, appropriate regulatory tools to control the impact of recreational angling on fish stocks, biological fisheries metrics, and how these factors relate to management objectives and realized fisheries responses. In order for regulatory tools, such as daily bag and size limits, to be effective, responses in angler effort must be reliably estimated relative to regulatory adjustment or management objectives. However, predicting angler effort responses to regulatory adjustment is difficult because responses depend on many factors, including the structure of prevailing and proposed regulations and the drivers of angler behavior (Carr-Harris and Steinback 2020). While quantitatively accounting for angler effort responses in fishery outcomes was beyond the scope of this evaluation, data on angler preference and sentiment regarding the current fishery and alternative regulations were considered alongside biological fisheries metrics.

Female spawning stock biomass is a metric of stock performance that is often relied on in fisheries management. Understanding the biological consequences of alternative harvest size restrictions such as minimum length limits, harvest bag limits, harvest slots (minimum and maximum length limits), and protected harvest slots is important in preventing recruitment overfishing, a condition in which the spawning stock is depleted to a level at which future recruitment declines strongly (Allen et al. 2013). In practice, harvest slot policies have been proposed as alternatives to minimum length regulations in some recreational fisheries because they are more likely to preserve natural age structures, positively affect spawning and recruitment potential, increase total harvest and trophy catch numbers, and reduce risk of population decline (Arlinghaus et al., 2010, Koehn and Todd, 2012, Ayllón et al., 2019). The Department must evaluate if the Striped

Bass population is at risk of recruitment overfishing under current regulations, as well as weigh stock conservation outcomes against fishery objectives under alternative length-based harvest scenarios.

The Department's scientific evaluation of the Striped Bass fishery contains a summary of the Department's public outreach efforts in the form of results from the Striped Bass Angler Preference Questionnaire, proceedings from a town hall meeting, Striped Bass angling regulations from their native range of the Eastern United States, and assessments of available Department data sets (inland and marine creel surveys and juvenile and adult abundance monitoring). Additionally, the Department has leveraged current and historic data, literature, and life history modeling tools to inform an age and size-structured population model to evaluate potential fishery tradeoffs resulting from changes in harvest regulations. Lastly, considerations for how changing the current Striped Bass fishing regulations may impact native species is reviewed. This information was used to inform the Department's assessment of the necessity, effectiveness, and feasibility of implementing a 20–30-inch slot limit in the Striped Bass fishery.

## **Public Input**

Understanding angler usage and participation is key to evaluating the health and performance of a fishery, as failing to consider angler effort responses can result in regulations that are insufficient in meeting intended objectives. (Carr-Harris and Steinback 2020). In response to the NCGASA proposal, the Department developed a Striped Bass Angler Preference Questionnaire and hosted a public Town Hall to gather information from the Striped Bass angling community on their thoughts about the overall fishery and determine if there was a general desire for changes to the Striped Bass fishery.

## **Striped Bass Angler Preference Questionnaire**

The questionnaire was sent out electronically to ~1 million angling license holders and was available in 7<sup>1</sup> languages. Prior to distribution, the questionnaire was

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<sup>1</sup> The initial Striped Bass Angler Preference Questionnaire (APQ) was only distributed in English due to the timing aligned with the change of the State of California fiscal year (July 1) and the need for renewal of the translation services contract. Upon contract renewal, the survey was redistributed (through email and social media posts) in Spanish, Tagalog, Vietnamese, Russian, Simplified Chinese, and Traditional Chinese.

reviewed by Fisheries Branch managers, the Human Dimensions Unit (who reviewed content for bias, leading language, etc.), and final approval was given by the Office of Communication and Outreach Branch (OCEO). There were 26,410 responses to the questionnaire, of which 18,751 indicated they do fish for Striped Bass and 7,659 did not. Briefly, results show that ~71% of Striped Bass anglers (11,981 out of 16,875) support the current minimum size for retention at 18 inches. When offered options for changing the minimum size limit, 54% of responses (8,975 out of 16,621) did not support increasing the minimum size from 18 inches while ~28% (4,653 out of 16,621) supported either lowering the minimum or no minimum at all (Table 1). However, 64% of responses (10,750 out of 16,797) supported a catch-and-release fishery for trophy sized Striped Bass even if it would require setting a maximum size limit (in effect a slot limit) on Striped Bass that could be harvested (Table 2). The definition of a trophy Striped Bass varied widely between responses, with 30, 36, and >40 inches reported most frequently (Figure 1). Complete results can be found in Appendix 1.

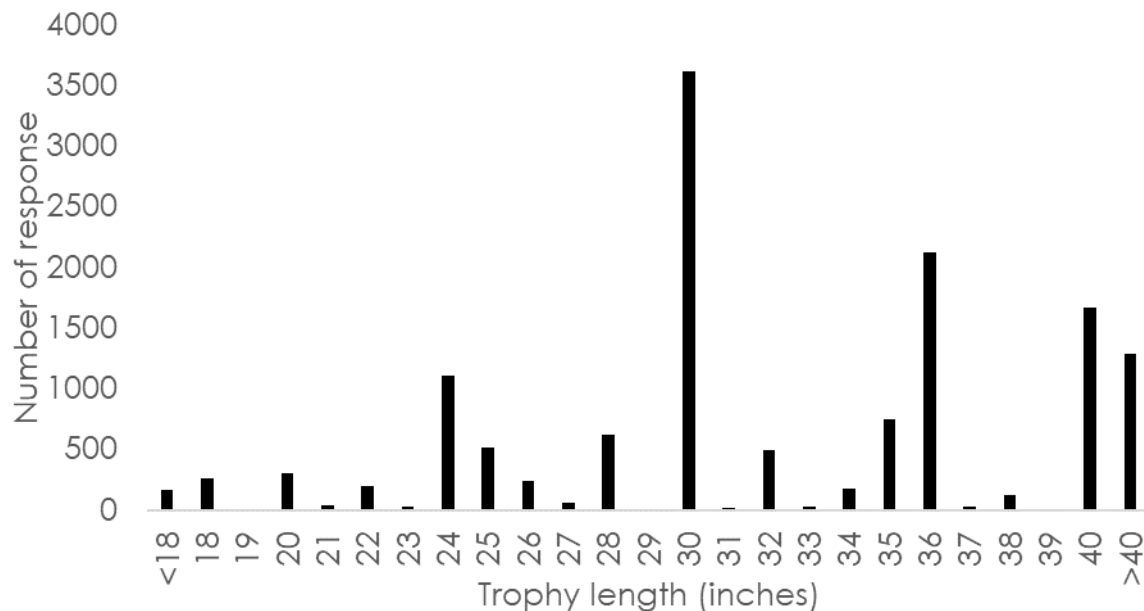
**Table 1.** Results from Question 4 in the 2022 Striped Bass Angler Preference Questionnaire. Results reflect responses to the question “Would you like to see the minimum size limit for harvest of Striped Bass”.

| No change (%) | No minimum size (%) | Lower than 18 inches (%) | Higher than 18 inches (%) | Number of Responses |
|---------------|---------------------|--------------------------|---------------------------|---------------------|
| 54            | 8                   | 20                       | 18                        | 16,621              |

**Table 2.** Results from Question 6 in the 2022 Striped Bass Angler Preference Questionnaire. Results reflect responses to the question “Would you support a catch and release fishery for trophy sized Striped Bass? This would require setting a maximum size/slot limit on Striped Bass”.

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 64      | 36     | 16,797              |





**Figure 1.** Figure 1.2 in Appendix 1, 2022 Striped Bass Angler Preference Questionnaire Results Summary. Fill-in-the blank responses to what size Striped Bass anglers considered a trophy. Data source: 2022 Striped Bass Angler Preference Questionnaire.

## Joint Town Hall Meeting

The Department hosted a joint public town hall meeting with the NCGASA on August 24, 2022. The meeting platform was hybrid with the option to attend in-person at the Fisheries Branch headquarters in West Sacramento or virtually via Zoom. The purpose of the meeting was to discuss the regulation change petition brought forth by the NCGASA, the Department's evaluation of the petition to date, and allow public questions and comments to the NCGASA and the Department.

The meeting was well attended with approximately 50 members of the public in attendance and 100 more attending virtually. Forty-five public comments were made at the meeting with 40 commenters supporting the proposed slot limit (20–30 inches TL), two commenters opposing the proposed slot limit, and three commenters who were neutral on the issue.

## **CDFW Monitoring Studies**

### *Angler Derived Fishery Data: Creel Surveys*

There is limited monitoring data for Striped Bass in California, restricting the Department's ability to accurately estimate population and size class abundance. The Department's primary sources of recreational angling data are collected by our Inland (Central Valley Angler Survey) and Marine (California Recreational Fisheries Survey) creel programs. From these programs, fishery metrics such as effort, catch, harvest, and size of the catch can be estimated; however, the size ranges observed in the fishery may not be reflective of the size class distribution or abundance in the population.

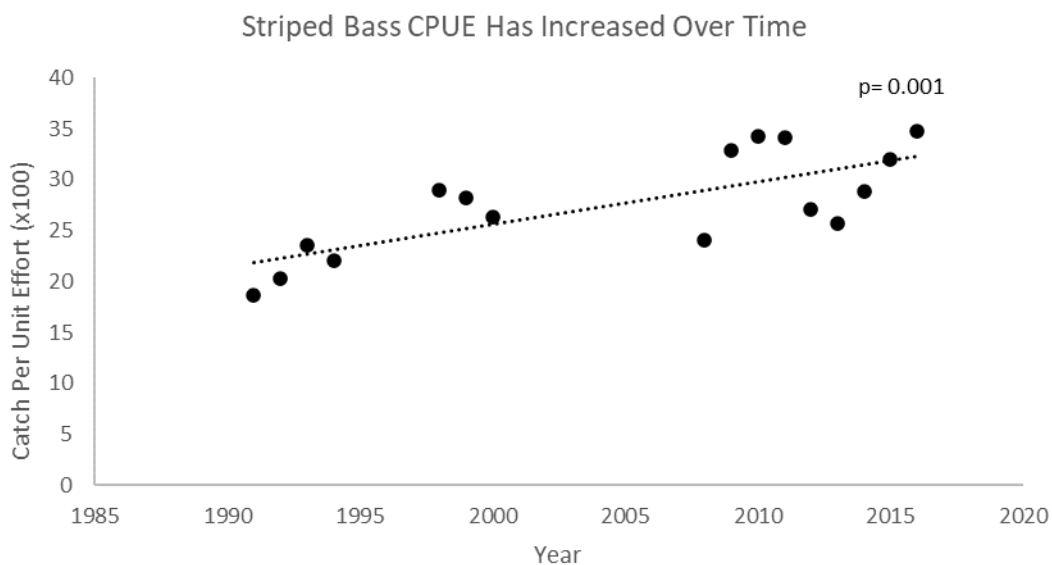
CPUE as a relative measure of abundance, for the purpose of monitoring trends in the Striped Bass fishery, can be used when absolute population estimates do not exist (Hilborn and Walters 1992, Quinn and Deriso 1999). However, these measures are best used in conjunction with population estimates to better understand CPUE trends in a broader context (Ward et al. 2013). Hyperstability is the "illusion of plenty", where CPUE is not linearly related to fish density. This often occurs when fisheries target aggregations of fish. Catch rates can remain stable, while abundance of the population declines (Erisman et al. 2011). Hyperstability has been documented in many commercial fisheries and a few recreational fisheries (Shuter et al. 1998, Rose and Kulka 1999, Erisman et al. 2011), and is often attributed to fish aggregations and changes in gear efficiency in commercial fisheries. However, the mechanisms driving hyperstability in recreational fisheries can be attributed to improved fishing techniques (technology, gear, and bait) and information sharing (social media, etc.).

Department creel surveys try to account for sampling factors that could contribute to hyperstability through their study designs. Sampling occurs over a large geographic area, year-round, and applies other randomly selected factors (start times, launch locations/ports, sample day, etc.). Building random stratification into the study design captures variability in angler effort (spatially and temporally), fish distribution and/or seasonality, and the range of angler experience (catchability).

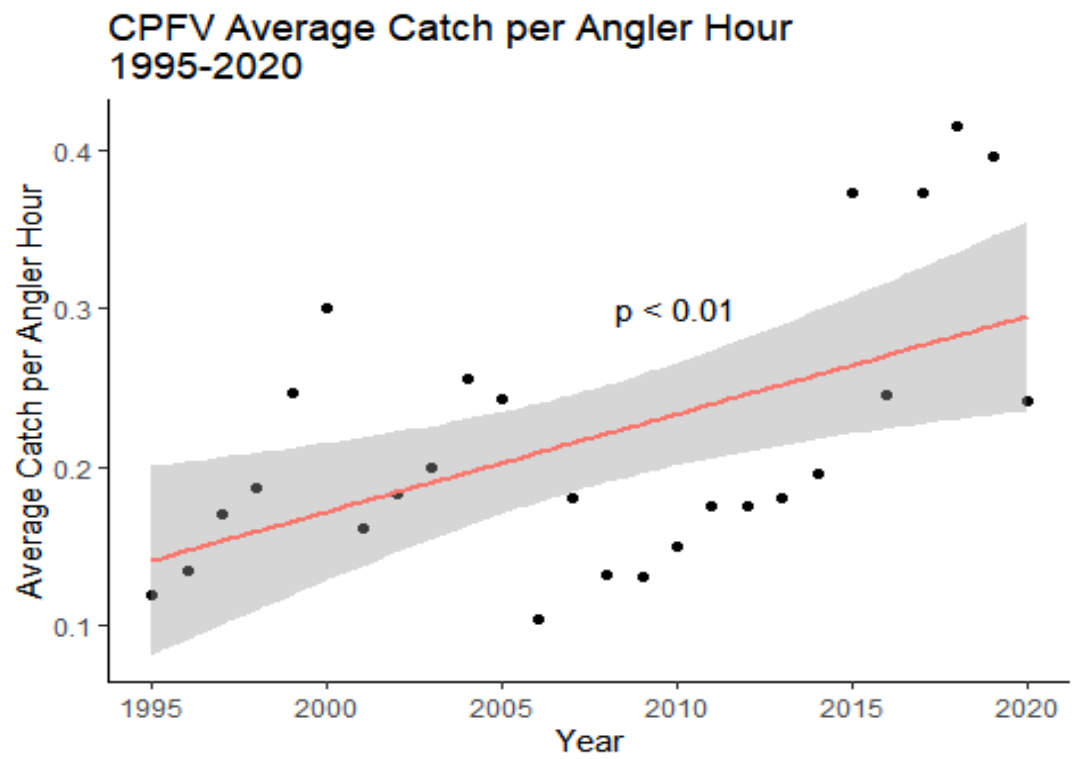
Based on The Department's Central Valley Angler Survey (CVAS) data, angler effort (total angler hours) targeting Striped Bass has not significantly changed during 1991–2016, however angler CPUE has increased significantly over the same period (Figure 2). Similarly, data collected from Commercial Passenger

Fishing Vessels (CPFV) during 1995–2020 also indicate that Striped Bass CPUE has significantly increased over time (Figure 3), providing evidence that fishery performance is improving in both fresh and marine waters.

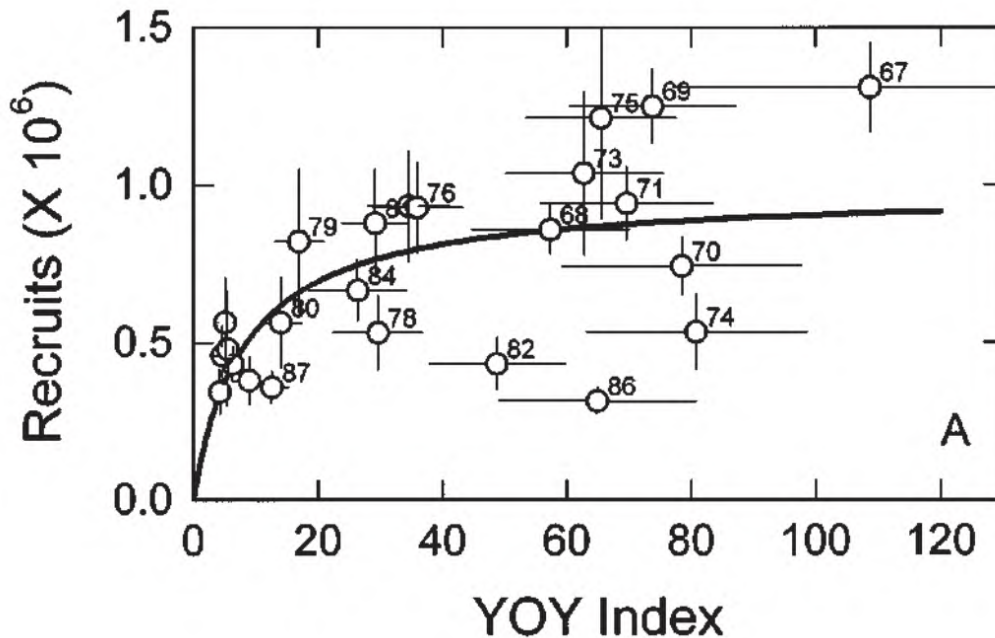
While CPUE from angler-based surveys have remained relatively stable or even increased over time (potential hyperstability), recruitment to age-0 has precipitously declined in the Delta (see Juvenile and Adult Monitoring section below). However, recruitment to age 3 (size of entry to the fishery) has been shown to be strongly density dependent (Figure 4, Kimmerer et al. 2000). This may buffer changes in fishable sized Striped Bass from the decline in recruitment of age-0 fish.



**Figure 2.** Average catch of Striped Bass per angler hour. Striped Bass CPUE has significantly increased over time ( $p = 0.001$ ). Data source: CVAS data.



**Figure 3.** Average catch of Striped Bass per angler hour. Data source: CPFV Logs.

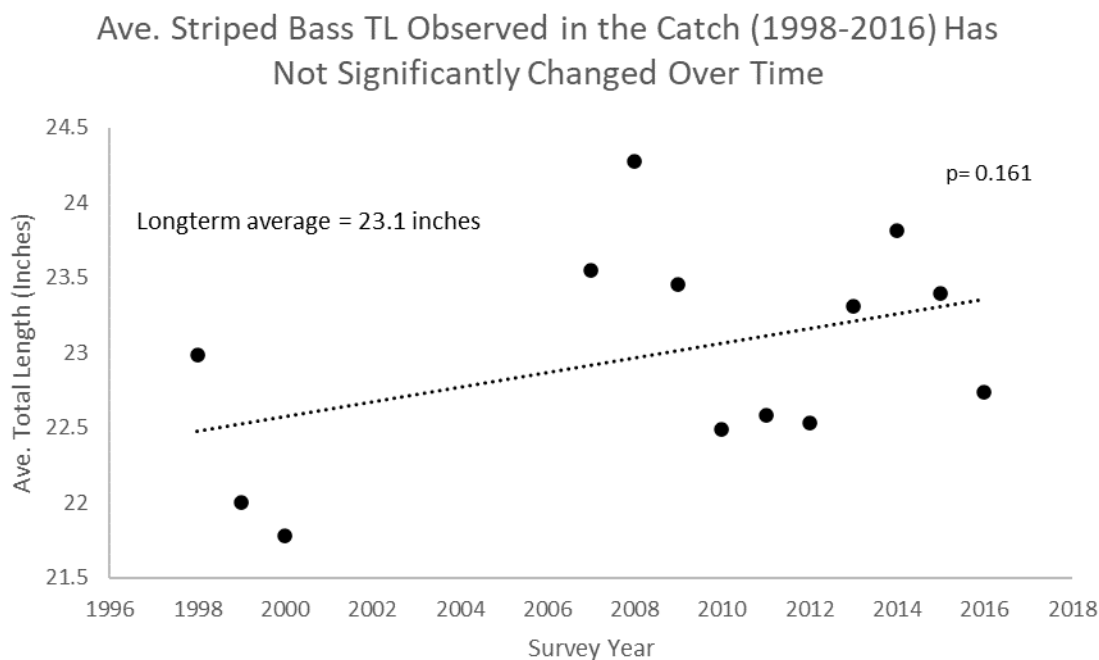


**Figure 4.** From Kimmerer et al. 2000 Fig 5(A). Young-of-the-year (YOY) index was estimated from a combination of Summer Townet Survey, Fall Midwater Trawl Survey and the San Francisco Bay Study. Recruits refers to abundance estimates of age-3 fish in the Adult Striped Bass Study.

Catch-per-unit-effort is one metric which is often used to evaluate fisheries stability. A declining CPUE may be an indication of overexploitation by recreational anglers. While an increasing CPUE may result from improvements in fishing technology (lures, fish finders, etc.) that increase anglers' ability to locate and catch fish, and/or may be an indication of an increasing Striped Bass population, particularly of sub-adults that are sub-legal size (<18 inches) for harvest in the fishery. Evidence of the latter comes from the significant increase in numbers of Striped Bass reported as released in both the inland and ocean/bay fisheries. Anglers typically report releasing Striped Bass because they are 1) practicing catch-and-release fishing, 2) the fish is larger than they find desirable, and most commonly 3) because the fish is smaller than what they can either legally keep or want to keep. However, angler catch data alone cannot be used to assess the status and trends of the Striped Bass population; fishery-independent population studies and assessments are also needed to address these questions.

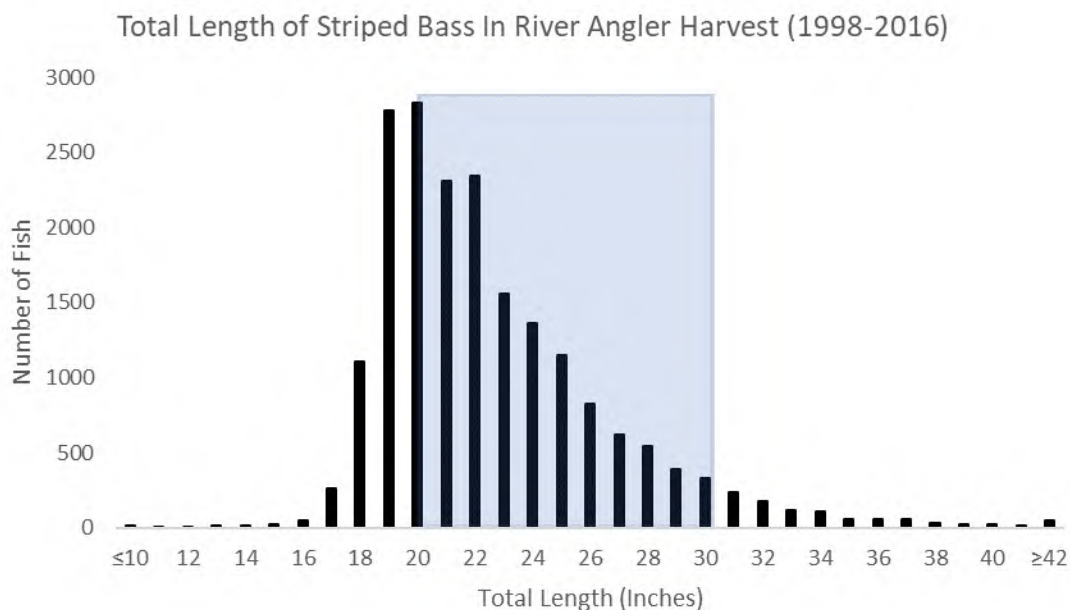


Another metric that can be evaluated for fisheries performance is fish size. An indication that a fishery may be in decline is a significant decrease in the size of fish harvested. The average size of Striped Bass harvested by anglers has not changed significantly over time (Figure 5). Inland harvest from 1998–2016 has remained around 23 inches total length (average), while Striped Bass harvested in the ocean/bay from 2010–2021 averages around 22 inches. Unfortunately, neither inland nor ocean surveys have historically collected size data on fish that are reported as released, thus it is possible that the size of fish released in the fishery has declined over time. Additionally, creel surveys do not monitor the nighttime Striped Bass fishery, so it is possible that there may be a difference in the size of Striped Bass harvested during the day when compared to what is harvested at night. Currently the Department does not have data to address these questions.

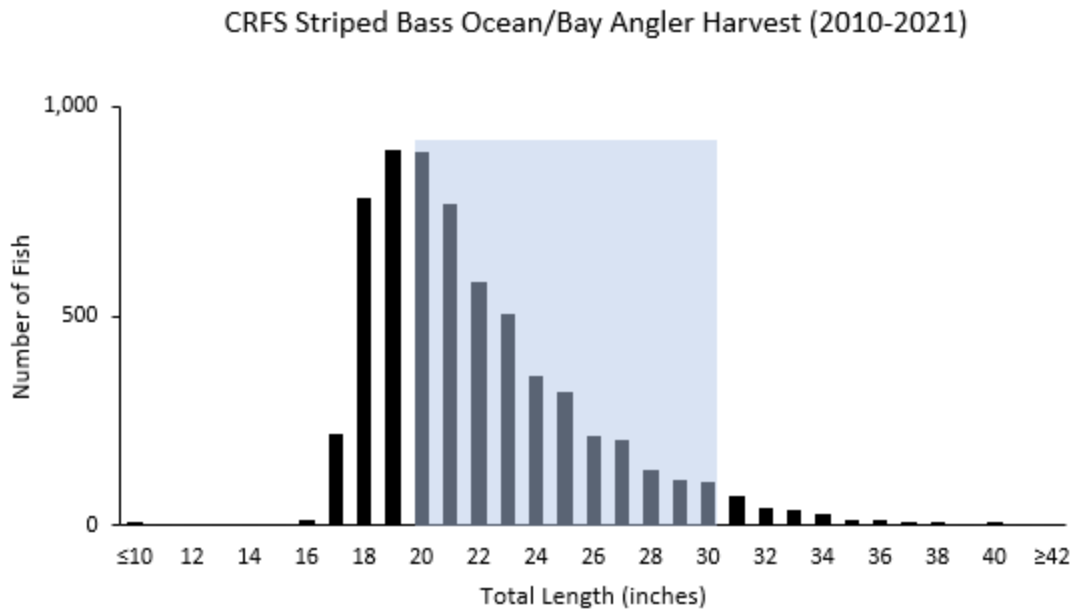


**Figure 5.** The average size of Striped Bass observed in angler catch by the Survey. The slope of the trend line is not significantly different than 0 ( $p = 0.161$ ) over the sampling period 1998–2016. Data source: CVAS.

Changes to Striped Bass fishing regulations may have unintended consequences, such as decreased harvest opportunity. For example, an increase to the minimum size for retention may decrease harvest opportunities for all anglers and may disproportionately impact disadvantaged communities that rely on recreational harvest for food security. In a survey commissioned by the California Department of Water Resources (DWR) (Ag. Innovations 2021), 90% of disadvantaged community (DAC) respondents indicated that they or their families consume fish from the Delta four to five times per week. Striped Bass comprised 33% of the catch that DAC anglers reportedly harvested. Currently, Striped Bass harvested in the < 20-inch category represents ~20% of the inland harvest (as reported by CVAS), and ~9% of the ocean/bay harvest (as reported by CRFS). This indicates that Striped Bass anglers are willing to keep smaller fish and may already struggle to catch legal-sized Striped Bass (Figures 6 and 7).



**Figure 6.** Length–frequency distribution of Striped Bass observed in angler harvest for Central Valley during 1998–2016. Proposed NCGASA slot limit highlighted in blue (74% of reported harvest falls within this range). Data Source: CVAS.



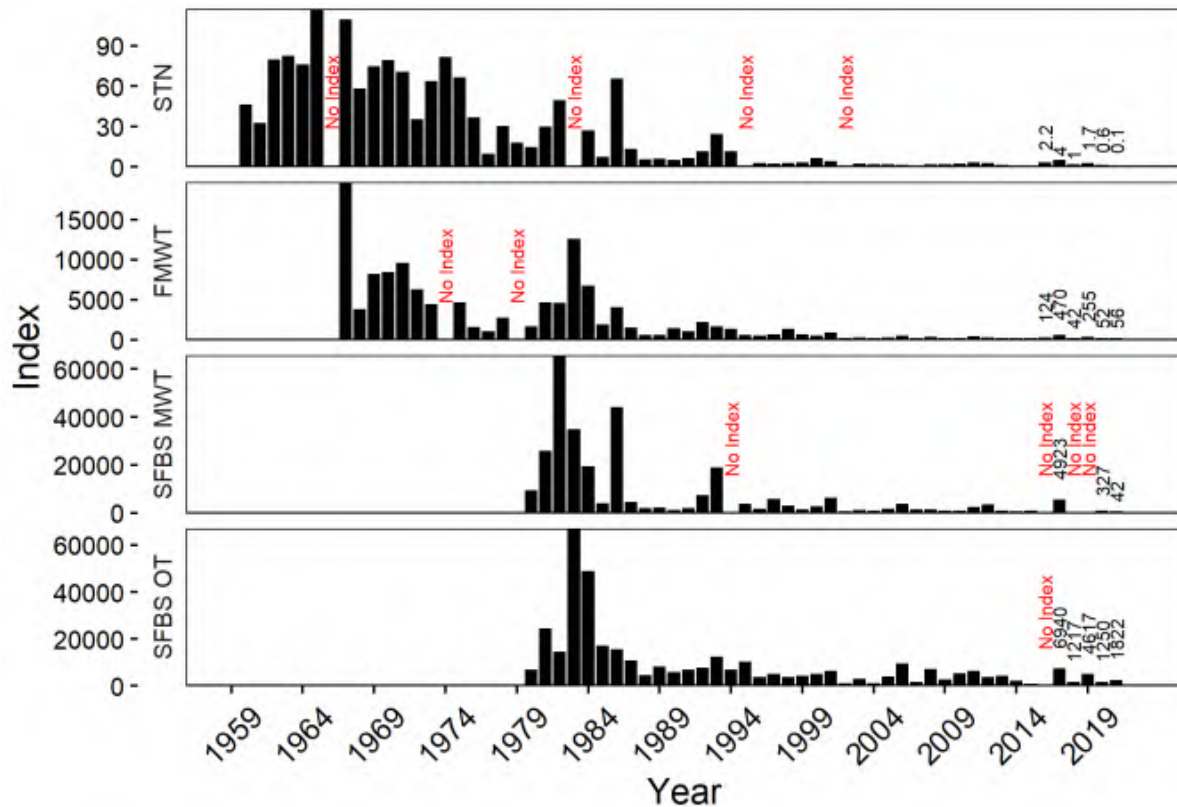
**Figure 7.** Length–frequency distribution of Striped Bass observed in angler harvest for Ocean/Bay during 2010–2021. Proposed NCGASA slot limit highlighted in blue (87% of reported harvest falls within this range). Data source: RecFIN (CRFS).

### *Juvenile Abundance Indices*

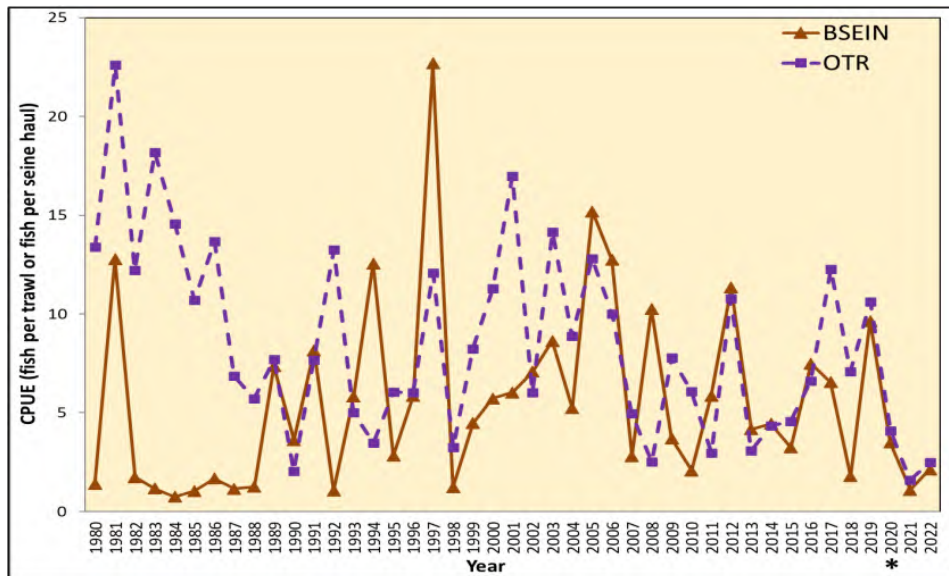
Juvenile abundance for Striped Bass inhabiting the Sacramento–San Joaquin Delta have been indexed using data collected during the Summer Townet Survey (STN, since 1959) and the Fall Midwater Trawl Survey (FMWT, since 1967). These surveys sample the pelagic, open–water habitats of the Delta through San Pablo Bay and target primarily age–0 fish. Age–0 Striped Bass abundance has also been indexed from the San Francisco Bay Study otter and midwater trawls (since 1980), which sample benthic and pelagic open–water habitats from the confluence of the Sacramento–San Joaquin Rivers to South San Francisco Bay. Finally, the UC Davis Suisun Marsh Fish Study (since 1980) also provides a long–term metric of juvenile abundance for Striped Bass inhabiting the sloughs of Suisun Marsh (data available upon request to UC Davis).

All the above–mentioned surveys have documented some level of decline in catch of age–0 or young Striped Bass over their operating history (Figures 8 and 9). These declines are most drastic in the open water surveys (STN, FMWT, SF Bay Study), while the Suisun Marsh Fish Study does not show as steep of a decline (Figure 9). The scale of the decline in the open water surveys may be partially explained by a lateral shift in distribution away from channel habitats to shoal

habitats, which are generally not as well surveyed by the STN, FMWT, and San Francisco Bay Study (Sommer et al. 2011). Regardless, the decline in abundance amongst all surveys to some degree indicates reduced spawning success and recruitment to age-0.



**Figure 8.** Figure 13 in Malinich et al. 2022. Index values for age-0+ (STN, FMWT) and age-0 Striped Bass (SFBS MWT, SFBS OT) from the Summer Townet Survey (STN), Fall Midwater Trawl (FMWT) and San Francisco Bay Study (SFBS) midwater trawl (MWT) and otter trawl (OT). See Malinich et al. (2022) for description of index values.



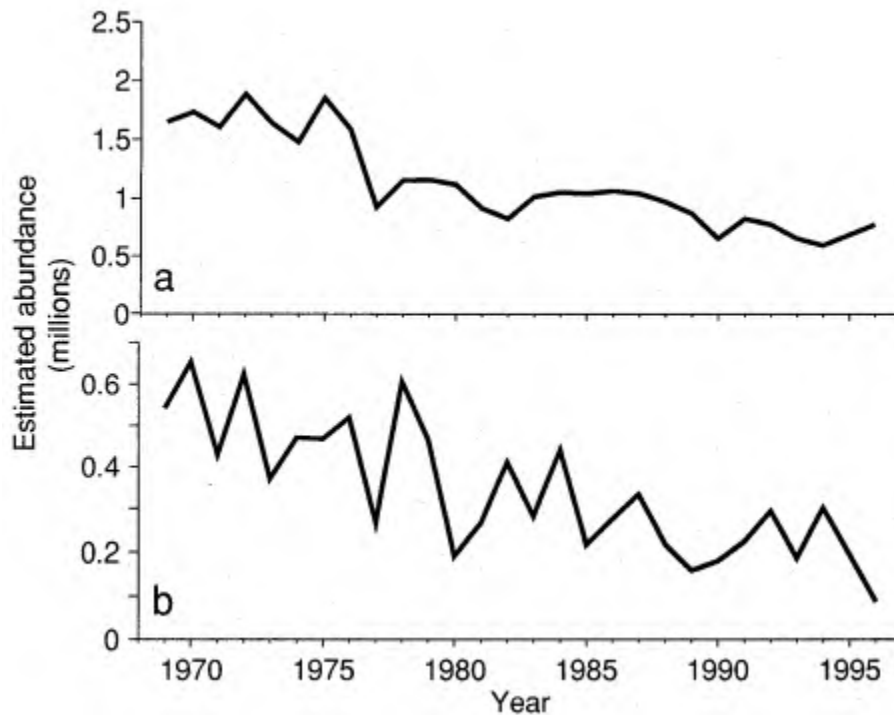
**Figure 9.** Figure 22 from O'Rear et al. (2022). Catch per unit effort (CPUE) of Striped Bass from the Suisun Marsh Fish Study beach seine (BSEIN) and otter trawl (OTR) surveys. See O'Rear et al. (2022) for description of CPUE calculations.

### *Adult Population Monitoring*

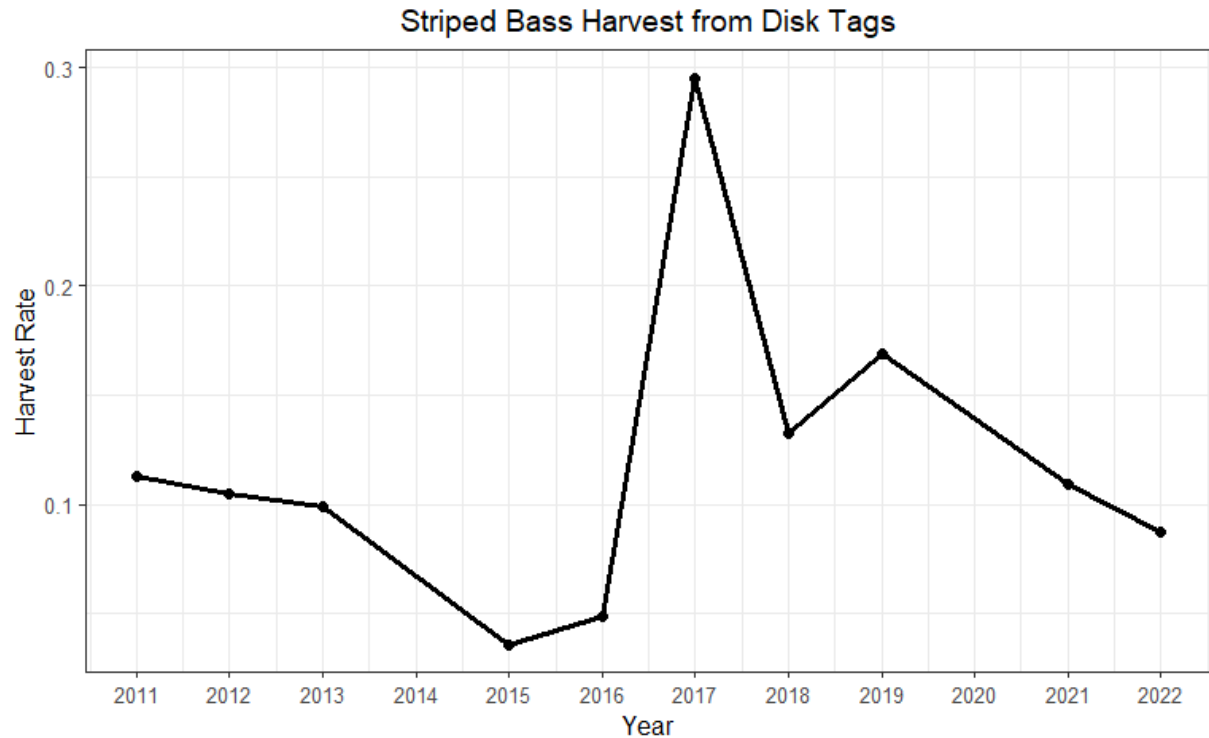
Adult abundance was first estimated in 1969 and continued through the early 2000s. These estimates relied on tagging and subsequent recapture of tagged individuals to generate Lincoln–Petersen population estimates. Estimates show a decline from 1.5–2 million adults in the 1960s and 1970s to fewer than 1 million adults by the late 1990s (Figure 10a). Similarly, age–3 Striped Bass declined from over 600,000 to approximately 100,000 during the same time period (Figure 10b). Harvest rates have also been generated as a product of the adult mark–recapture program. Using high–reward tags and angler tag returns, harvest rates can be calculated from 2011 to 2022. During this time period, harvest rates averaged 12%, with a low of approximately 4% in 2015 and a high of 29% in 2017 (Figure 11). Decreased funding and an associated reduction in the number of tags released and recovered resulted in the inability to reliably calculate abundance estimates using mark–recapture methods after the early 2000s. However, recent abundance estimates calculated using the combined inland and marine harvest estimated from CVAS and CRFS creel surveys, as well as harvest rate from tag returns, resulted in an average of 1,157,275 legal–sized (> 18–inches TL) Striped Bass estimated from 2011–2016. Abundance estimates during this period ranged from 604,695 legal–sized Striped Bass in 2013 to 2,252,748 in 2015. Abundance estimates using harvest and harvest rate are



restricted to this time period due to year-round sampling limitations by CVAS. Additionally, these estimates do not account for harvest in the night fishery or from those fish harvested outside of the CVAS survey area and are therefore biased low.



**Figure 10.** Estimated abundance of a) legal sized Striped Bass ( $\geq 18$  inches total length) and b) age-3 Striped Bass in the Sacramento-San Joaquin Watershed from 1969–1996. Figure from Kohlhorst (1999).



**Figure 11.** Estimated harvest rate of Striped Bass in the Sacramento–San Joaquin Watershed from 2011–2022.

## Population Model

### Model overview

To understand potential fishery tradeoffs resulting from proposed regulatory changes to the Striped Bass (*Morone saxatilis*) recreational fishery, we developed a sex-specific age and size-structured population model. The model predicts the sex-specific abundance of growth-type groups for each age at equilibrium as a function of density-dependent recruitment, natural mortality, harvest mortality, and discard mortality. The model accounts for differences in the impact of length-based harvest on females and males by modelling their abundance independently with different average growth rates and contributions to the total fecundity of the stock. Multiple growth-type groups were modelled for each sex to account for inherent variation in fish growth and the cumulative effects of size-selective harvest on the size structure of the stock. We applied the model to evaluate the relative performance of a range of length-based harvest restrictions with a focus on the current MLL and a recently

proposed harvest–slot limit (HSL) at meeting fisheries and conservation management objectives. To account for uncertainty in life history, recruitment, and fishery inputs, we simulated the distribution of plausible model outcomes using a Monte Carlo simulation approach. With this approach we evaluated four management priorities, including stock conservation, total harvest, catch of trophy-sized fish, and total catch.

## Methods

### *Model Formulation*

We model the number of fish of each sex and growth–type–group recruiting to age–1 at equilibrium ( $R_{g,s}$ ) with a Botsford–modified Beverton–Holt stock–recruitment function (Beverton and Holt 1957, Botsford and Wickham 1979, Botsford 1981a, Botsford 1981b) as,

### Equation (Eq.) 1

$$R_{g,s} = \dot{p}_s p_g R_0 \left( \frac{CR - \phi_0 / \phi_f}{CR - 1} \right),$$

where  $CR$  is the Goodyear recruitment compensation ratio (Goodyear 1977, 1980) that describes the maximum relative increase in juvenile survival as the total fecundity is reduced from the unfished biomass to near zero (Walter and Martell 2004). The parameters  $\phi_0$  and  $\phi_f$  are the per–recruit fecundity of the unexploited stock and the exploited stock, respectively. The parameter  $R_0$  is the average number of juvenile fish recruiting to age–1 in the unfished stock, which is analogous to the carrying capacity of the stock. The parameter  $p_g$  is a vector of fixed proportions that apportion the number of recruits each year to each growth–type–group ( $g$ ). By apportioning recruits in fixed proportions, the assumption that variation in growth is a non–heritable trait is made explicit. The parameter  $\dot{p}_s$  is a fixed sex ratio of recruits.

The fecundity per recruit of the stock in the fished ( $\phi_f$ ) and unfished ( $\phi_0$ ) condition was calculated as,

### Eq. 2

$$\phi = \sum_a \sum_g p_{g,s=f} S_{a,g,s=f} f_{a,g,s=f} (1 - e^{-\theta * p_{male}}),$$

where  $S_{a,g,s=f}$  is finite survival rate for females, and  $f_{a,g,s=f}$  is the reproductive biomass of females at age  $a$  in growth-type-group  $g$ . The term  $(1 - e^{-\theta * p_{male}})$  modifies the fecundity based on the ratio of reproductive males to females –per Heppel et al. (2006), where the parameter  $p_{male}$  represents the per-recruit proportion of mature males in the fished condition and  $\theta$  represents the relative contribution of male to female reproductive biomass in the reproductive process. This modification to the per-recruit fecundity calculation formalizes the assumption that females are the primary contributors to the annual fecundity of the stock while accounting for the influence of altered sex ratios due to differential effects of size-selective harvest on the male and female components of the stock. The reproductive biomass  $f_{a,g,s}$  for both sexes was approximated as the difference between the weight and weight-at-maturation for each age, growth-type-group, and sex.

For each sex and growth-type-group, survivorship  $S$  to age  $a$  was calculated recursively as,

### Eq. 3

$$S_{a,g,s} = S_{a-1,g,s} e^{-M_{a-1,g,s}} (1 - \dot{V}_{a-1,g,s} V_{a-1,g,s} U) (1 - (\dot{V}_{a-1,g,s} \dot{U} - \dot{V}_{a-1,g,s} V_{a-1,g,s} U) D),$$

where  $S_{a-1,g,s}$  is the finite annual natural survival rate (i.e.,  $S_{a,g,s} = e^{-M_{a,g,s}}$ ) that models the proportion of fish surviving from deaths due to natural causes. The parameter  $M_{a,g,s}$  is the instantaneous annual natural mortality rate, and the terms  $\dot{V}_{a,g,s}$  and  $V_{a,g,s}$  are the length-based vulnerabilities of fish to capture and harvest (respectively). The parameter  $D$  models discard mortality rate, which represents the proportion of caught and released fish that die due to the capture and handling process, and  $\dot{U}$  and  $U$  represent capture and harvest rate, respectively.

We modeled the instantaneous annual natural mortality rate  $M_{a,g,s}$  as inversely proportional to fish length per Lorenzen (2000) as,

### Eq. 4

$$M_{a,g,s} = M_{ref} \left( \frac{L_{ref}}{L_{a,g,s}} \right),$$

where  $L_{ref}$  is a reference length where the natural mortality rate is known to be a given value (i.e.,  $M_{ref}$ ). This formulation describes natural mortality as higher for

smaller, younger fish and lower for larger, older fish, which is a pattern that is consistent across fish species (Lorenzen 2000) and is important when determining length-based harvest regulations (Ahrens et al. 2020).

The vulnerability of each sex, age and growth-type-group to capture ( $\dot{V}_{a,g,s}$  in Eq. 3) was described as a dome shape with a double logistic model to describe reduced vulnerability of smaller and larger fish relative to moderate sizes as,

**Eq. 5**

$$\dot{V}_{a,g,s} = \left( \frac{1}{1 + e^{-\left(\frac{L_{a,g,s} - L_{low}}{\sigma * L_{a,g,s}}\right)}} - \frac{1}{1 + e^{-\left(\frac{L_{a,g,s} - L_{high}}{\sigma * L_{a,g,s}}\right)}} \right),$$

where  $L_{a,g,s}$  is the length of fish at age  $a$  in growth-type-group  $g$  for sex  $s$ ;  $L_{low}$  is the lower total length at which fish are 50% vulnerable to capture;  $L_{high}$  is the upper total length at 50% vulnerability to capture; and  $\sigma$  approximates the standard deviation of the logistic distribution. The left terms in Eq. 5 model increasing vulnerability to angling with length, and the right terms models declining vulnerability to angling with length. Values of  $\sigma$  specify the steepness of each side of the dome-shaped vulnerability curve.

The vulnerability of each sex, age and growth-type-group to harvest was modeled as Boolean variables where a value of 1 indicated that fish of age  $a$  in growth-type-group  $g$  were of size legal to harvest (i.e., within range given the MLL or HSL evaluated) and a value of 0 indicated that they were not. Thus, we specified vulnerability to harvest with a logical test as,

**Eq. 6**

$$V_{a,g,s} = 1, \text{ when } L_{min} < L_{a,g,s} < L_{max}$$

$$V_{a,g,s} = 0, \text{ when } L_{min} > L_{a,g,s} \text{ or } L_{max} < L_{a,g,s}$$

Where specified values of  $L_{min}$  and  $L_{max}$  represent the length-based harvest regulation, with  $L_{min}$  as the lower and  $L_{max}$  as the upper legal length for harvest.

We modelled the growth of males and female fish in each growth-type-group independently with a standard Bertalanffy (1938) growth model as,



**Eq. 7**

$$L_{a,g,s} = L_{\infty,g,s}(1 - e^{-k(a-t_0)}),$$

where  $L_{\infty,g,s}$  is the asymptotic (maximum) size of growth-type-group  $g$  for sex  $s$ ,  $k$  is the metabolic parameter that determines the rate that  $L_{\infty,g,s}$  is attained, and  $t_0$  is the theoretical age at length equal to zero. We simulated variability in growth by assigning each growth-type-group a unique  $L_{\infty,g,s}$  based on a range between  $\pm 20\%$  of an average annual asymptotic length  $\bar{L}_{\infty,s}$  (Walters and Martell 2004). The weight of fish was calculated with a standard weight/length relationship as:

**Eq. 8**

$$w_{a,g,s} = aL_{a,g,s}^b,$$

where  $a$  is the scaling parameter and  $b$  is the allometric parameter that modifies the relationship between length and weight.

*Simulation Process*

We ran our model as a Monte Carlo simulation in three main steps by, 1) defining a set of MLL and HSL regulations to be evaluated, 2) generating a random sample of input parameter values, and 3) running the model iteratively for the full combination of regulations and inputs to produce a sample of predicted outcomes for each regulation. We defined a set of length-based regulations as the combination of a range of minimum ( $L_{min}$ ) and maximum ( $L_{max}$ ) legal-size limits. We achieved this by creating vectors for  $L_{min}$  and  $L_{max}$  in 1 cm increments from 30 cm to a maximum legal length  $L_{max}$  (set at 182 cm, i.e., + 20% the maximum value of  $\bar{L}_{\infty}$ ). The vector for  $L_{max}$  ranged from the minimum value of the  $L_{min}$  vector +1 (i.e., 31 cm) to 182 cm. All regulations with  $L_{max} = 182$  cm and  $L_{min} < 182$  cm represent MLL regulations while all regulations with  $L_{min} < L_{max} < 182$  cm represent HSL regulations. All regulations with  $L_{min} > L_{max}$  were excluded from the process.

All additional input parameters were either fixed values or drawn randomly from sampling distributions to account for fishery and biological uncertainty. Distributions for randomly drawn inputs were specified such that the central tendency and variation in parameter values were plausible based on multiple

data sources, published values, and life–history theory. The uncertainty associated with key life history and stock recruitment inputs including the density–dependent compensation ratio  $CR$ , the average asymptotic length  $\bar{L}_{\infty}$ , the metabolic growth parameter  $k$ , the instantaneous natural mortality rate  $M_{ref}$ , and the length at maturation  $L_{mat}$  were obtained using the R package *Fishlife* (Thorson et al. 2017, Thorson 2019, Thorson 2022). The R package *Fishlife* was created to provide life history and stock recruitment parameters with measures of uncertainty important for determining sustainable regulations for data–limited fisheries. The package utilizes data from over 10,000 fish populations contained in the Fishbase database (Froese and Pauly 2017) in a hierarchical multivariate generalized linear mixed model to predict mean parameter values and a covariance matrix based on taxonomic relationships. To further inform the estimation process, we used parameter values available in the literature with the model updating feature provided in the package to produce the covariance matrix used for generating these input parameters (e.g., Rudd et al. 2019). All input parameters of the model, mean values, and sampling distributions are defined in Tables 3 and 4, and fully justified in Appendix 2.

**Table 3.** Average life history and biological parameter input values used for population simulations of Striped Bass.

| Parameter            | Description                                                                | Male Value          | Female Value        | Sampling Distribution                           |
|----------------------|----------------------------------------------------------------------------|---------------------|---------------------|-------------------------------------------------|
| $R_0^2$              | Beverton-Holt Stock Recruitment: Average annual unfished recruitment       | 1                   | 1                   | Fixed                                           |
| $CR^2$               | Beverton-Holt Stock Recruitment: Compensation ratio                        | 11.6                | 11.6                | $CR \sim \text{MvN}(\mu, \Sigma)$               |
| $\theta^2$           | Sex ratio: Fertility function parameter                                    | -                   | 50.4                | $\theta \sim \text{U}(a = 20, b = 80)$          |
| $L_{\infty, \min}^3$ | Growth: Minimum asymptotic length (cm)                                     | 96.8                | 106.3               | Derived                                         |
| $L_{\infty, \max}^3$ | Growth: Maximum asymptotic length (cm)                                     | 145.2               | 159.5               | Derived                                         |
| $\bar{L}_{\infty}^4$ | Growth: Average asymptotic length (cm)                                     | 121                 | 132.9               | $\bar{L}_{\infty} \sim \text{MvN}(\mu, \Sigma)$ |
| $k^4$                | Growth: Von Bertalanffy growth coefficient ( $\text{yr}^{-1}$ )            | 0.1                 | 0.1                 | $k \sim \text{MvN}(\mu, \Sigma)$                |
| $t_0^4$              | Growth: Theoretical age at length 0 (years)                                | -1.4                | -1.4                | Fixed                                           |
| $L_{\text{mat}}^4$   | Maturation: Length (cm) at maturation (years)                              | 35.1                | 58                  | $L_{\text{mat}} \sim \text{MvN}(\mu, \Sigma)$   |
| $A_{\text{max}}$     | Mortality: Maximum age (years)                                             | 30                  | 30                  | Fixed                                           |
| $M_{\text{ref}}^5$   | Mortality: Natural mortality rate at $L_{\text{ref}}$ ( $\text{yr}^{-1}$ ) | 0.15                | 0.15                | $M_{\text{ref}} \sim \text{MvN}(\mu, \Sigma)$   |
| $L_{\text{ref}}^5$   | Mortality: Reference length where $M = M_{\text{ref}}$ (cm)                | 90                  | 90                  | Fixed                                           |
| $a^6$                | Length-weight: scaling parameter                                           | $4.8 \cdot 10^{-5}$ | $2.7 \cdot 10^{-5}$ | Fixed                                           |
| $b^6$                | Length-weight: allometric parameter                                        | 2.7                 | 2.8                 | Fixed                                           |

<sup>2</sup> Appendix 2.2.5

<sup>3</sup> Appendix 2.2.1

<sup>4</sup> Appendix 2.2.3

<sup>5</sup> Appendix 2.2.4

<sup>6</sup> Appendix 2.2.2

**Table 4.** Average fishery parameter input values used for population simulations of Striped Bass.

| Parameter               | Description                                                  | Mean Value | Sampling Distribution                                                 |
|-------------------------|--------------------------------------------------------------|------------|-----------------------------------------------------------------------|
| $L_{troph}$             | Minimum TL of trophy-size fish (cm)                          | 76         | Fixed                                                                 |
| $D$ <sup>7</sup>        | Discard Mortality rate                                       | 0.29       | $D \sim B(\alpha = 3.75, \beta = 9.25)$                               |
| $U$ <sup>8</sup>        | Harvest rate                                                 | 0.14       | $U \sim B(\alpha = 5, \beta = 30)$                                    |
| $\dot{U}$ <sup>8</sup>  | Catch rate                                                   | 0.35       | $U/(1 - r_{rate})$                                                    |
| $\delta$ <sup>8</sup>   | Release rate                                                 | 0.58       | $\delta \sim B(\alpha = 70, \beta = 50)$                              |
| $L_{low}$ <sup>9</sup>  | Lower bound of length that is 50% vulnerable to capture (cm) | 48         | $N(\mu = 60, \sigma = 3)$                                             |
| $L_{high}$ <sup>9</sup> | Upper bound of length that is 50% vulnerable to capture (cm) | 79         | $L_{low} + \Delta,$<br>$\Delta \sim \log N(\mu = \ln(5), \sigma = 1)$ |

### Model Outputs

We defined a set of model outputs as management performance metrics relevant to four primary objectives for the Striped Bass fishery. These objectives include three fisheries objectives to 1) maximize harvest, 2) maximize total catch, and 3) maximize catch of trophy-sized fish, and the objective to 4) provide stock conservation. Because the true value of the average number of fish recruiting to age-1 in the unfished condition is unknown, we specified management performance metrics for the fisheries objectives relative to the predicted values for the current MLL. These metrics included the percent change in harvest, total catch, and catch of trophy-sized fish between the

<sup>7</sup> Appendix 2.1.2

<sup>8</sup> Appendix 2.1.1

<sup>9</sup> Appendix 2.1.3

evaluated regulation and the current MLL. We calculated harvest, total catch, and catch of trophy-sized fish as,

**Eq. 9**

$$H = U \sum_a \sum_g \sum_s N_{a,g,s} \dot{V}_{a,g,s} V_{a,g,s}$$

**Eq. 10**

$$C = \dot{U} \sum_a \sum_g \sum_s N_{a,g,s} \dot{V}_{a,g,s}$$

**Eq. 11**

$$T = \dot{U} \sum_a \sum_g \sum_s N_{a,g,s} t_{a,g,s} \dot{V}_{a,g,s}$$

where  $N_{a,g,s}$  is the predicted abundance of fish for each age, growth-type-group and sex. The parameter  $t_{a,g,s}$  in Eq. 11 is a Boolean variable that takes the value of one when  $L_{a,g,s}$  (Eq. 7) is greater than or equal to trophy size ( $L_{troph}$ , Table 4). The abundance of each sex at age for each growth-type-group was calculated as,

**Eq. 12**

$$N_{a,g,s} = R_{g,s} S_{a,g,s}$$

where  $R_{g,s}$  is the number of fish recruiting to age-1 for each growth-type-group and sex (Eq. 1) and  $S_{a,g,s}$  is their survival to each age (Eq. 3).

We used three performance metrics to evaluate the ability of regulations to conserve important components of the reproductive process as measures of stock conservation, which included, 1) spawning stock biomass, 2) mature stock sex ratio, and 3) reproduction by older female fish. The conservation of spawning stock biomass was represented as the probability of each regulation resulting in a spawning potential ratio (SPR)  $\geq 0.35$ . The spawning potential ratio is defined as the ratio of fished to unfished stock fecundity and is commonly used to indicate the risk of recruitment overfishing (i.e., exploitation at a rate beyond stock replacement; Goodyear 1990, Mace and Sissenwine 1993). Minimum values of SPR required for stock persistence vary in the literature from values of



0.3 to 0.5 (Walters and Martelle 2004). We adopted the value of  $SPR \geq 0.35$  from the 2022 Albemarle Sound–Roanoke River Striped Bass stock assessment (Lee et al., 2022) as an indication of spawning stock biomass conservation and calculated the probability of each regulation meeting this criterion as,

**Eq. 13**

$$SPR_{prob} = \sum_I \left( \frac{R\phi_f}{R_0\phi_0} \geq 0.35 \right) / I_{total},$$

where  $R$  is recruitment at equilibrium in the fished condition (Eq. 1),  $\phi_0$  and  $\phi_f$  is the per-recruit fecundity of the unexploited and exploited stock (respectively, Eq. 2),  $R_0$  is the average number of juvenile fish recruiting to age–1 in the unexploited stock (Table 3),  $I$  indicates each model iteration, and  $I_{total}$  is the total number of model iterations.

We chose the percent change in mature male sex ratio ( $r_{male}$ ) between the current and evaluated harvest regulations to account for potential influence of the interaction between variable growth and maturation rates of male and female Striped Bass and length–based vulnerabilities to capture and harvest that may alter the sex ratio (McCleave and Jellyman 2004). In the case of Striped Bass, where females grow and mature at faster rates than males, increased harvest pressure on larger fish may impact the reproductive capacity of the population if exploitation results in disproportionate removal of females. Furthermore, population resilience to exploitation or unfavorable environmental conditions may increase with higher fecundity contribution from larger females. While it is assumed that fecundity scales linearly with body size in individual fishes (i.e. isometric relationship; Walters and Martell, 2004), many marine species demonstrate disproportionately higher reproductive output with body size (i.e. hyperallometric relationship; Barneche et al. 2018). Larger female Striped Bass have been reported to produce larger eggs, larger newly hatched larvae (Monteleone and Houde 1990) and may have higher hatching success than younger females (Zastrow et al. 1990). To capture the impact of regulations on age–specific reproductive output, we used the percent change in the fecundity contribution of females aged  $\geq 10$  years to the total fecundity of the population between the current and evaluated harvest regulations, calculated as,

**Eq. 14**

$$\gamma = \frac{\sum_{a \geq 10} \sum_g N_{a,g,s=f} f_{a,g,s=f}}{\sum_a \sum_g N_{a,g,s=f} f_{a,g,s=f}},$$

where  $N_{a,g,s=f}$  is the predicted abundance (Eq. 12) and  $f_{a,g,s=f}$  is the reproductive biomass for females within each age and growth-type-group.

We compared the following three alternative regulations to the results of the current (a) 46–cm TL MLL regulation: (b) 51–76–cm TL HSL, (c) 46–76–cm TL HSL and (d) 70–90–cm TL (Table 5). Regulations (b) and (c) serve as two candidate regulations under consideration as alternatives to the current MLL: (b) was proposed by NCGASA with the goal of increasing opportunities for mature females to spawn before entering the fishery (by increasing the minimum harvest length), and providing protection for older, more fecund females that escape the fishery (see *Introduction* for more details). Additionally, this regulation has the added benefit of creating a trophy fishery by limiting the maximum harvest size to 76–cm TL. Regulation (c) represents an alternative to regulation (b) to allow for continued harvest at the current MLL while establishing a trophy fishery by limiting the maximum harvest size to 76–cm TL. Lastly, we measure the outcome of the current 46–cm TL MLL against (d) East Coast Striped Bass regulations to compare results to a conservation-focused management strategy that is currently implemented for Atlantic stocks (Table 5).

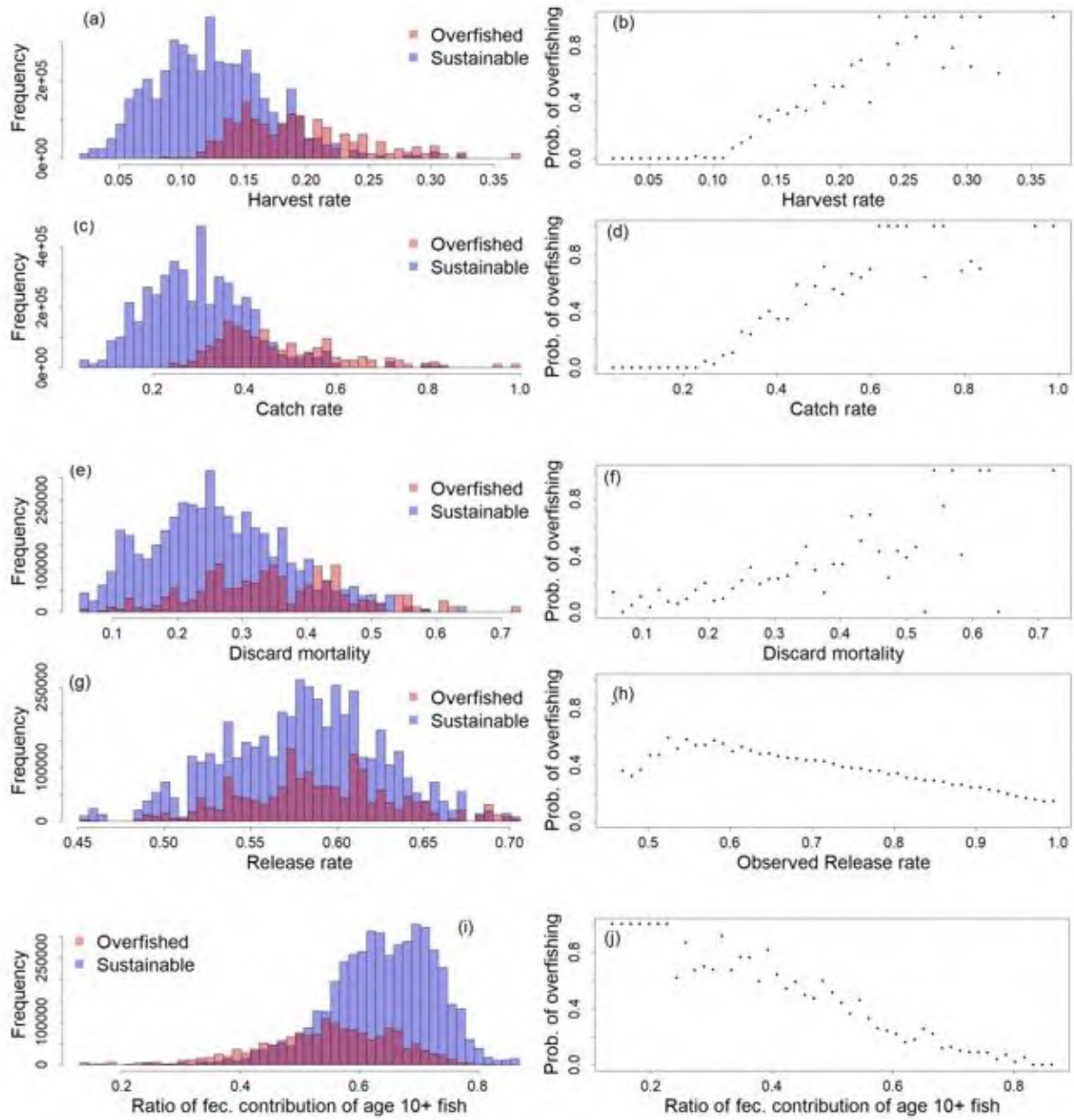
**Table 5.** Current regulations and proposed and alternate slot limit ranges in consideration for the Striped Bass (*Morone saxatilis*, Moronidae) fishery in California.

| Regulation                            | Description                                   |
|---------------------------------------|-----------------------------------------------|
| (a) 46 cm (~18 inches) TL MLL         | Current Striped Bass regulation in California |
| (b) 51-76 cm (~20-30 inches) TL HSL   | Slot limit proposed by NCGASA                 |
| (c) 46 - 76 cm (~18-30 inches) TL HSL | Current MLL with upper HSL proposed by NCGASA |
| (d) 70-90 cm (~28- 35 inches) TL HSL  | East coast regulations (for comparison)       |

## Model Results

### *Conditions that affect overfishing.*

The probability that length-based harvest regulations resulted in overfishing for Striped Bass varied across several fishery and population conditions (Figure 12). The probability of the model resulting in an  $SPR < 0.35$  (i.e., overfishing) increased as harvest rate ( $U$ ), catch rate ( $\dot{U}$ ), and discard mortality ( $D$ ) increased (Figure 12a–f). The probability of overfishing was more variable at high discard mortality rates, likely because (1) these scenarios occurred less frequently in the simulation and (2) high discard mortality conditions that resulted in low probabilities of overfishing included below average values for catch rate (13%) and harvest rate (5%). The probability of overfished conditions occurring declined as the ratio of fecundity contribution of females age  $\geq 10$  years ( $\gamma$ ) increased (Figure 12i–j), suggesting a relationship between fecundity contribution from larger females and population sustainability. Overfishing was also less likely to occur as release rate ( $\delta$ ) increased (Figure 12g–h), but values never reached zero due to some level of discard mortality present.



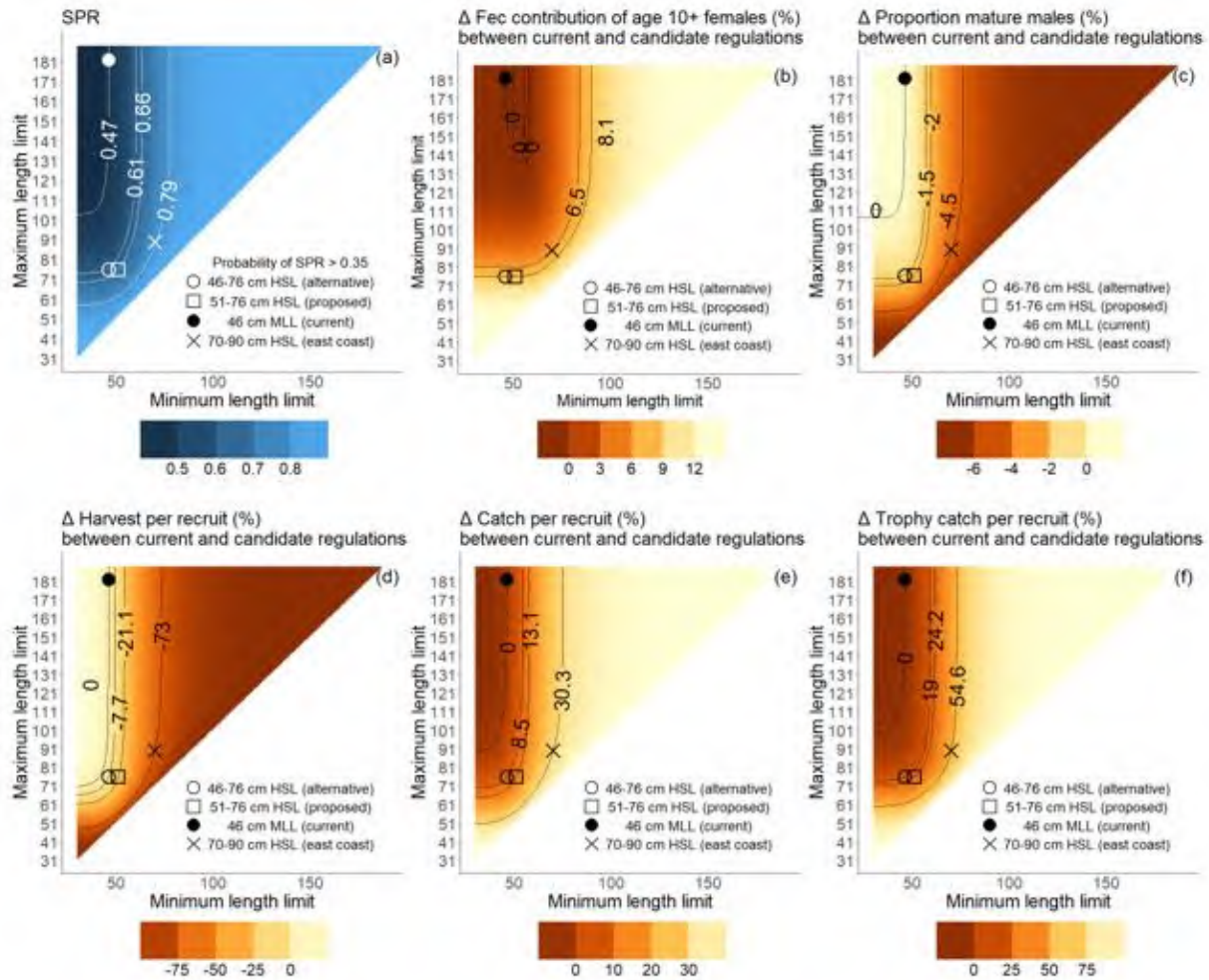
**Figure 12.** Histograms (left) and scatter plots (right) of simulated values for harvest rate ( $U$ , a–b), catch rate ( $\tilde{U}$ , c–d), discard mortality ( $D$ , e–f), release rate ( $\delta$ , g–h), and outputs for fecundity contribution of older (age 10+) fish ( $\gamma$ , i–j) that result in SPR values representing overfished (SPR < 0.35) and sustainable (SPR ≥ 0.35) conditions.

### *Performance of MLLs and HSLs for fishery objectives*

Except for harvest, candidate HSLs outperformed the current MLL for all fishery objectives. The probability of meeting conservation thresholds ( $SPR \geq 0.35$ ) under the current 46–cm TL MLL regulation was 47%, compared to 61% and 66% for a HSL with the current MLL 46–76–cm TL and the NCGASA–proposed 51–76–cm TL HSL, respectively. This probability increased to 79% under East Coast regulations (70–90–cm TL HSL) (Figure 13a). The fecundity contribution of older ( $\geq$  age 10) fish was higher under HSLs relative to the current MLL, but no differences resulted between the HSLs of interest (Figure 13b). Fecundity contribution of older fish was 6.5% higher than the current MLL under the East Coast HSL, and 8.1% higher under both candidate HSLs (46–76–cm and 51–76–cm) (Figure 13b). Differences in the estimated proportion of mature males in the population between the current and evaluated regulations were minimal, ranging from 1.5–4.5% lower than the current MLL (Figure 13c).

Compared to the three evaluated HSLs (Table 5), the current MLL resulted in the highest harvest per–recruit estimates (Figure 13d). However, the 46–76–cm HSL performed similarly, with harvest only 7.7% lower than that under the current MLL. Harvest estimates decreased by 21.1% under the candidate 51–76–cm HSL and were 73% lower than the current MLL under the East Coast HSL (70–90 cm) (Figure 13d). However, the East Coast HSL resulted in the largest percent increase in catch compared to the current MLL (30.3%), followed by the two candidate HSLs (Figure 13e). Evaluated HSLs performed similarly to each other, resulting in an estimated 8.5% and 13.1% increase in catch per–recruit under the 46–76–cm and 51–76–cm HSL, respectively. Relative to the current MLL, estimates of trophy catch per–recruit was 19% and 24.2% higher under the 46–76–cm and 51–76–cm HSLs (respectively) and 54.6% higher under the East Coast regulation (Figure 13f).





**Figure 13.** Model results describing (a) the probability of regulations resulting in an  $\text{SPR} \geq 0.35$  and the percent difference in (b) the ratio of fecundity contribution of age 10+ females, (c) the proportion of mature males in the population, (d) harvest per recruit, (e) total catch per recruit, and (f) catch of trophy-sized fish per recruit between current regulations (46-cm MLL) and a continuous range of MLLs and HSLs. The four evaluated regulations (Table 5) are denoted by symbols.

## Model Discussion

Our simulation procedure produced more favorable outcomes for nearly all management priorities under HSLs compared to the currently enforced 46-cm MLL. The evaluated HSL regulations produced the greatest improvements to the catch of trophy fish and SPR but represented a trade off in harvest numbers.

HSLs produced more modest improvements to the total catch, the sex ratio and fecundity contribution of older females. These improvements were similar between the two evaluated HSL regulations; however, the harvest tradeoff was greatest for 51–76–cm HSL compared to 46–76–cm HSL.

These results corroborate a growing body of literature that indicate HSLs as an effective alternative to more common MLLs for promoting stock conservation while maintaining catch and harvest opportunities. For example, Gwinn et al. (2015) demonstrated that protecting both immature and large fish from harvest results in a better compromise among management objectives including harvest, trophy–catch, and stock conservation for both short and long–lived species. Ahrens et al. (2020) advanced this work by accounting for the impacts of density and size–dependent growth, mortality, and fecundity on optimal harvest schedules, finding that harvest slots typically outperformed minimum length limits for harvest and catch–related objectives. This work also highlighted the importance of low discard mortality rates for the benefits of HSLs to be realized. Similarly, the benefits for HSLs have been predicted for individual fisheries such as Murray Cod (*Maccullochella peelii*, Koehn and Tood 2012), Northern Pike (*Esox lucius*, Arlinghaus et al., 2010), Gulf of Mexico Red Snapper (Bohabor et al., 2022), Gag Grouper (Tetzlaff et al., 2013), as well as East Coast Striped Bass (Carr–Harris and Steinback 2020). This body of literature, including this study, suggests that in the recreational fisheries context, HSLs can provide a better outcome for meeting diverse fisheries objectives.

The efficacy of each HSL of interest ultimately depends on the Department's management plan for Striped Bass, which is currently defined by broad goals for the fishery as opposed to quantitative measures. A management goal primarily focused on conservation of the species may consider HSLs closer to East Coast regulations (70–90–cm HSL) to ensure harvest policies result in > 75% probability of population sustainability (Figure 13a). However, these more restrictive regulations conflict with The Department's (CDFW) responsibility to preserve recreational opportunities in the form of harvest, which would decrease by 73% relative to current levels (Figure 13d). Prioritizing harvest numbers above other fishery objectives is best supported by the current MLL, or a wide harvest slot that encompasses most sizes that are vulnerable to catch modeled for the recreational fishery (~46–100 cm). If the management objective is to enhance recreational fishing opportunities in the form of catch numbers, HSLs better achieve this goal compared to the current MLL. Possibly the most realized benefit of HSLs in terms of catch comes in the form of catch size, as the evaluated HSLs produced substantially higher (19–54%, Figure 13f) numbers of

trophy-sized catch compared to the current MLL. Thus, HSLs provide multiple benefits to the angler experience, including higher catch rates and improved quality of catch (as defined by fish size).

Pursuant to section 703 of the California Fish and Game Code, it is the policy of the Fish and Game Commission that the Department takes actions to promote a self-sustaining Striped Bass population in support of a robust recreational fishery while considering the potential impacts of Striped Bass population growth on native species (FGC 2020). Therefore, regulations that balance stock persistence and recreational catch and harvest opportunities are of primary interest to the Department. Based on model results, the current 46 cm MLL may not be sufficient to ensure the long-term sustainability of the population. Model simulations resulted in a 53% probability of recruitment overfishing ( $SPR < 0.35$ ) under this regulation, versus a 34–39% probability under the evaluated HSLs (51–76-cm and 46–76-cm HSL, respectively) (Figure 13a). While the probability of meeting a SPR target of  $\geq 0.35$  relative to the current MLL is marginally higher (5%) under a 51–76-cm HSL, this small improvement comes at the cost of harvest opportunities. Harvest was estimated to decrease by about 21% relative to current levels under a 51–76-cm HSL compared to only a ~8% decrease under a 46–76-cm HSL (Figure 13d). These results align with data collected by creel surveys, which show that Striped Bass harvested in the <20-inch category represent ~20% of the inland harvest (CVAS) and ~9% of the ocean/bay harvest (CRFS) (Figures 6 and 7). Thus, when compared to the proposed 51–76-cm HSL, the 46–76-cm HSL results in a more optimal balance between population sustainability and harvest opportunities.

Evaluated HSLs resulted in higher total catch relative to the current MLL, however, improvements were moderate (8.5% and 13.1% increase under 46–76 and 51–76-cm HSL, respectively) and only reached a maximum of ~40% higher under the most restrictive harvest regulations (Figure 13e). This is most likely due to constraints placed on catch by the highly dome-shaped length selectivity curve used in the model (Figure 2.3). This curve was informed by length selectivity estimated for Atlantic Striped Bass caught in the recreational fishery (Carr-Harris and Steinback 2020) and is supported by the strong dome-shaped selectivity of other large-bodied recreational fish species reported in the literature (see Appendix 2.1.3). The modeled selectivity curve renders larger fish less vulnerable to catch, thus decreasing the risk of fishery mortality from harvest or discard. The dome-shaped vulnerability curve may also moderate the results of trophy catch (Figure 13f) under the candidate HSLs, as a more asymptotic length selectivity curve would have yielded in higher differences in these

outcomes relative to the current MLL. While trophy catch (relative to the current MLL) is 5.2% higher under a 51–76-cm HSL compared to a 46–76-cm HSL (Figure 13f), this gain may not be worth the ~13% loss in harvest opportunities that results from increasing the lower HSL from 46 to 51 cm (Figure 13d). Furthermore, higher abundance of trophy-sized fish resulting from the 51–76-cm HSL compared to the 46–76-cm HSL may not be enough to produce differences in the proportion of fecundity contribution from older (age 10+) females ( $\gamma$ ) between the two regulations (Figure 13b). In other words, increasing the lower HSL from 46 to 51 cm does not translate into an increase in the proportion of total fecundity that is contributed by older fish.

While modest (8.1%), candidate HSLs improved  $\gamma$  relative to the current MLL (Figure 13b), which may have positive implications on recruitment success and stock conservation for Striped Bass. Lim et al. (2014) found positive correlations between maternal size and offspring size and number within species across a range of taxa, suggesting that energy investment into individual offspring changes with female size. This can have substantial impacts on recruitment, as larger offspring are less vulnerable to size-dependent mortality and therefore typically experience higher survival rates (Conover and Schultz 1997). The importance of preserving large females by way of HSLs is evident in Le Bris et al. (2015), who demonstrated that population resilience to and recovery from perturbations (i.e. exploitation) was most impacted by the relationship between female size and fecundity. They found that preservation of large fish that possessed non-linear mass-fecundity relationships, as suggested for Striped Bass (Zastrow et al. 1990, Cowan and Rose 1991), increased the ability of the population to withstand and recover from high fishing pressure. Therefore, using HSLs to increase the proportion of total fecundity contributed by larger females may help buffer Striped Bass populations against fluctuations resulting from high exploitation rates and environmental stochasticity.

Our results suggest that the performance of the length-based regulations evaluated are highly sensitive to the catch, harvest, and discard mortality rates of the fishery. This finding is consistent with the literature for both MLLs (Coggins et al. 2007) and HSLs (Gwinn et al. 2015, Ahrens et al. 2020). For HSLs to be effective at preventing overfishing and improving trophy fisheries, the cumulative mortality from discards and harvest must be low enough to allow a proportion of legal fish to grow out of the slot and into larger protected size classes. Higher rates of these sources of mortality will require narrower harvest slots to achieve fishery benefits. This highlights the importance of understanding these rates when designing HSL regulations. Considering data limitations on

discard mortality for the CA Striped Bass fishery, we ran our simulations with a broad range of values. This uncertainty results in lower resolution for predicting differences in the outcomes among competing regulations. A more refined understanding of this parameter for this fishery would increase the ability to distinguish among regulation performances.

## **Predation Considerations**

With the potential to increase Striped Bass population abundance from regulation changes (which requires California Environmental Quality Act [CEQA] permitting), we must consider the impact these changes may have on California Endangered Species Act (CESA) and Federal Endangered Species Act (ESA)-listed prey species the Department is also tasked with managing.

While Striped Bass are known opportunistic predators on salmonid and smelt species, their diets have been found to primarily consist of macroinvertebrates, crayfish, lamprey, and other non-native predator and prey species in aquatic and estuarine habitats (Raney 1952, Callahan et al. 1989, Grossman 2016, Michel et al. 2018, Stompe et al. 2020, Young et al. 2022). Fish become a more important prey item for Striped Bass in the spring and summer (Nobriga and Feyrer 2007, Zeug et al. 2017, Young et al. 2022), which coincides with the seaward migration of salmonids from freshwater habitats.

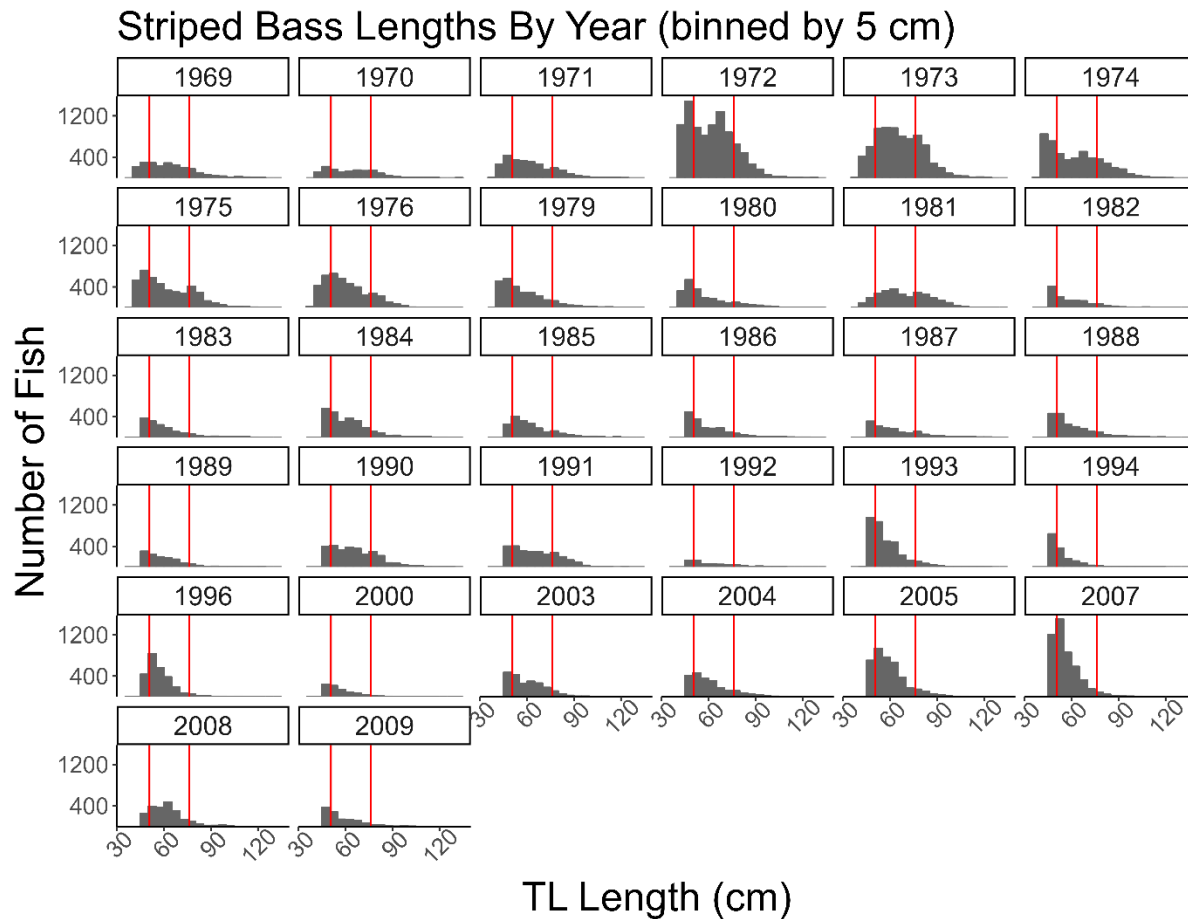
Observations of salmonids in Striped Bass stomachs vary by life stage and season, but overall remains relatively low (Stevens 1966, Michel et al. 2018, Stompe et al. 2020, Peterson et al. 2020, Brandl et al. 2021). While predation on listed species does occur, there is not enough evidence to support the assertion that Striped Bass predation is the primary contributor to declining salmonid and smelt populations based on available piscivorous predation data in California. Instead, Striped Bass predation impacts should be considered within the broader context of environmental stressors on native fishes, and not necessarily singled out as a significant contributor to salmonid declines.

Striped Bass consume a wide variety of prey species and do not tend to specialize on certain prey items (Zeug et al. 2017, Brandl et al. 2021); however, predation of salmonids and smelt species may be more prevalent in specific size classes of the Striped Bass population based on abundance and spatial/temporal distribution. The profitable prey size for Striped Bass is related to the prey-to-predator size ratio (PPR), where capture success decreases as the



PPR ratio increases (Hartman 2000). Fish are unimportant in the diets of YOY Striped Bass, as diet during this life stage is primarily driven by plankton abundance (Heubach 1963). In a diet composition study of large Atlantic Striped Bass, Walter and Austin (2003) found significant relationships between Striped Bass total length and prey length ( $p < 0.05$ ), indicating that larger and older Striped Bass ate larger prey. Poor regression fit ( $r^2 = 0.26$ ) indicated that large fish also consumed small prey, supporting the argument that larger Striped Bass consume a greater size range of prey. Smaller Striped Bass in this study (458–710 mm [ ~ 18–28 inches]) consumed prey that approached 40% of their total length; however, most prey consumed by all sizes of Striped Bass were smaller, young-of-the-year fishes. This finding is corroborated by Overton (2002), who predicted an optimal prey size to be 21% of the Striped Bass length.

If similar predator–prey dynamics hold true for Striped Bass in California, smolts (ranging from 70–140 mm), as classified by Sturrock et al. (2019) may represent optimal prey size for smaller Striped Bass (13–27 inches). CDFW Fyke trap data show that Striped Bass entering the Sacramento River in the spring are generally < 28 inches (Figure 14), and therefore may exhibit similar feeding patterns to the ‘small’ Striped Bass in Walter and Austin (2003). Furthermore, Loboshefsky et al. (2012) found that while individual consumption of adult Striped Bass was higher than sub–adults, population total consumption of sub–adults was similar to adults due to greater abundance of sub–adults in the system. A harvest slot may shift the population structure to increase the abundance of older, large fish, yet this still may not have a noticeable impact on salmonid predation due to (1) PPR, (2) high variation in the size of prey consumed, and (3) little evidence of prey specialization. Increasing the minimum length limit from 18–20 inches may have a more noticeable impact on salmonid consumption, however, as this protects a size class of Striped Bass more likely to encounter and consume smolt–sized fishes due to (1) potentially higher delta and freshwater residency of smaller Striped Bass compared to larger, more migratory fish (Dorazio et al. 1994) and (2) more optimal PPR between this size class and smolts.



Fyke Net Tagging Program

**Figure 14.** Length–frequency histograms for Striped Bass sampled from fyke nets. Parallel vertical red lines indicate the NCGASA–proposed 20–30 inch total length (51 – 76 cm) slot limit. Note that effort is not accounted for in catch. Data Source: Adult Striped Bass Population Study.

Despite these considerations, most of the literature reviewed suggests that Striped Bass consumption of salmonids and smelts is relatively low compared to other prey items. That said, Striped Bass are widespread, highly opportunistic, generalist predators that display aggregatory feeding behavior, particularly near manmade structures and habitat pinch–points (Tucker et al. 1998; Sabal et al. 2016). Thus, temporal overlap between Striped Bass and salmonids is an important factor to consider. Decreased precipitation and associated warming water temperatures could elicit earlier Striped Bass spawning migrations, increasing temporal overlap between Striped Bass and out–migrating juvenile salmonids in the Sacramento River system (Goertler et al. 2021). Climate change and the environmental conditions of an increasingly degraded Delta may

continue to increase contact between Striped Bass and listed species, and it is difficult to predict the role that protective harvest regulations will play on the predatory impact of Striped Bass in this context. The completed CDFW Predation Literature Review document can be found in Appendix 3.

## **Informing Broader Management Strategies from East Coast Regulations**

When designing fishing regulations, management objectives are generally set as the target. The Department's management goals are guided by the California Fish and Game Commission's Striped Bass Policy (FGC 2020), which states that the Department shall "...emphasize programs that ensure, enhance, and prevent the loss of sport fishing opportunities" and "...strive to maintain a healthy, self-sustaining Striped Bass population in support of a robust recreational fishery." The intended goal of the NCGASA-proposed 20–30-inch harvest slot limit is to increase abundance of Striped Bass as well as protect larger Striped Bass in the population. This desire is consistent with the California Fish and Game Commission's policy, as the policy also supports actions to increase Striped Bass abundance if the actions are consistent with the Department's long-term mission and public trust responsibilities.

For the purposes of this regulation change petition (TN 2022–12) evaluation, the Department evaluated four regulation options for comparison of the NCGASA proposed 20–30-inch slot limit (Table 5). Because the petition requested only one specific HSL and did not include alternative HSL options or other considerations such as changes to season, bag limit, geographic range, the Department's evaluation specifically focused on the proposed 20–30-inch HSL. If the Department had independently determined that the status and trends observed in the Striped Bass fishery warranted regulatory changes to preserve and improve the fishery, multiple regulatory strategies beyond a pre-defined HSL would have been evaluated to determine which strategy, or combination of strategies, would be the most effective to determine or maintain biological and management objectives.

Within Striped Bass native ranges, Atlantic states have adopted various regulatory practices to meet their management goals (Figure 15, ASMFC 2022). In many states, freshwater (rivers) and marine environments have different regulations to protect migratory and spawning Striped Bass while also providing

fishing opportunity. The majority of the Atlantic states' coastlines, as well as the ocean, have a 28–35-inch HSL. However, several areas (particularly in producer areas) enforce slot limits or smaller minimum sizes that allow the harvest of smaller Striped Bass, starting at 18–20 inches depending on the state. There are no regions that include a 20–30-inch slot limit comparable to the NCGASA proposal (K. Drew, ASMFC, personal communication, January 23, 2023).

Atlantic States management (regulations) are based on female spawning stock biomass and fishing mortality targets for the migratory stock complex, which represent the best available scientific information. There are a number of different combinations of size limits and harvest levels that would allow them to achieve the desired spawning stock biomass target and management objectives, and stakeholder needs are considered when they set the size limits and other regulations (ASMFC 2019). The coastal/ocean minimum size limit of 28 inches represents the size at full maturity for Atlantic coast Striped Bass, and therefore fisheries with lower size limits are harvesting immature fish. Those fisheries occur in the producer areas where mature Striped Bass are only available during the spawning season. The Atlantic States Marine Fisheries Commission (ASMFC 2022) allows harvest of those smaller fish and forgoes yield of larger fish in order to create more equitable access to the resource between stakeholders in the ocean region and stakeholders in the producer areas, based on historical fishing patterns (K. Drew, ASMFC, personal communication, January 23, 2023).

In response to the 2015 mandate by the ASMFC to decrease harvest, many coastal and Chesapeake Bay states decreased the recreational bag limit from two to one fish,  $\geq 28$  inches TL (ASMFC 2014). While these changes successfully hit coast-wide harvest reductions goals, they failed to translate into improvements in the female spawning stock biomass (ASMFC 2016b, ASMFC 2017, NEFSC 2019).

To understand the immediate economic and biological trade-offs resulting from harvest restrictions that favor larger Striped Bass, Carr–Harris and Steinback (2020) evaluated the effect of 36 alternative recreational Striped Bass fishing policies (Table 6 in Carr–Harris and Steinback 2020) on (1) expected angler welfare (measured as the level of compensation required to hold anglers' expected utility constant after a policy-induced change in fishing trip quality), (2) total recreational removals, and (3) mature female recreational removals relative to the simulated outcome of the actual 2015 policy of one fish,  $\geq 28$ –inches TL. Simulations revealed that policies that decreased the baseline minimum from 28 to 20 or 24 inches (thus directing harvest toward frequently

encountered yet lower-valued smaller Striped Bass) while constraining harvest of rarely encountered yet higher-valued large Striped Bass resulted in increases of recreational harvest that were incommensurate with concurrent welfare gains (Carr-Harris and Steinback 2020). The one fish 28–36-inches TL HSL regulation was the sole policy analyzed that resulted in a non-trivial reduction in recreational removals relative to the actual 2015 MLL policy (one fish  $\geq 28$ -inches TL). This policy resulted in only a slight reduction in angler welfare due to the relatively low frequency at which Striped Bass  $\geq 36$  inches are encountered in the fishery (Carr-Harris and Steinback 2020).

While the effect of length-based regulation changes on angler welfare was not incorporated into the Striped Bass population model presented here, we interpret angler harvest opportunity as a proxy for angler satisfaction. Results from the Striped Bass Angler Preference Questionnaire indicate that 51% of respondents fish for Striped Bass to catch and eat (Question 10, Appendix 1). Furthermore, an Environmental Justice Community Survey conducted for the California Department of Water Resources showed that the overwhelming majority (90%) of the self-identified disadvantaged community (DAC) members surveyed eat fish from the Delta four or more times per week (Ag. Innovations 2021). Aside from those that chose 'other or not specified' (35%), the majority of DAC respondents (51%) indicated that they catch Striped Bass (Ag. Innovations 2021). These results suggest that Striped Bass is an important food source for California anglers, and that failing to maintain harvest opportunities may present an issue for the communities that depend on this resource as a part of their diet.

Compared to the proposed 20–30-inch HSL, our model of the California Striped Bass population estimated that an 18–30-inch HSL would result in a smaller decrease in total harvest relative to current regulations while maintaining the same fecundity contribution of older females in the population (see Population Model section). As with the 'most efficient' regulation of one 28–36-inch fish identified in Carr-Harris and Steinback (2020), an 18–30-inch HSL maintains the lower length limit at the status quo while only excluding harvest opportunity for size classes infrequently encountered in the fishery (see Figure 6 and Figure 7). Thus, we can infer that this regulation may have a similarly low impact on angler welfare as estimated in Carr-Harris and Steinback (2020).

As observed on the East Coast, there are several combinations of harvest size and bag limits that, in concept, could be implemented in California to be more protective of the female spawning biomass and may contribute to increased spawning success compared to the current regulations. However, increasing



Striped Bass abundance and size of fish may not be possible through changes to angling regulations alone due to environmental constraints, carrying capacity, and/or other factors. Examples of management strategies observed on the East Coast (Figure 15) that could be applied to the California Striped Bass fishery (if deemed appropriate) include, but are not limited to:

- Harvest slot limits (as evaluated in this petition)
- Lower or higher minimum size limits
- Split slot limit(s)
- Seasonal closures / Seasonal regulation changes
- Geographic closures (seasonal and/or permanent)
- Increased or decreased bag limits
- Gear Restrictions
- Regulations specific to marine and/or freshwater locations
- Regulations specific to charter boats and private boats
- Combination of more than one option

| State and Region       | Season                                         | Daily Possession Limit |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  |                 |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|------------------------------------------------|------------------------|----|------------------------------------------------|----|----|----|-----------------|----|----|----|------------------------|----|----|----|----|----|----|----|----|----|----|-----|--|--|--|--|-----------------|--|--|--|--|--|----------------|--|--|--|--|--|--|--|--|--|--|--|
| ME marine              | All year <sup>a</sup>                          |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  | 1*              |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| NH marine              | All year                                       |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  | 1* <sup>+</sup> |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| MA marine              | All year                                       |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  | 1*              |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| RI marine              | All year                                       |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  | 1*              |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| CT marine              | All year                                       |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  | 1*              |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| NY marine              | 4/15–12/15                                     |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  | 1               |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| Delaware River         | All year                                       |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  | 1               |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| Hudson River           | 4/1–11/30                                      | 1                      |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  |                 |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| NJ marine              | 3/1–12/31                                      |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  | 1**             |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| Delaware River & tribs | 6/1–3/31                                       |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  | 1**             |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| PA Delaware R. upriver | All year                                       |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  | 1               |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| Delaware R. tidal      | All year <sup>b</sup>                          | 2                      |    |                                                |    |    |    |                 |    |    |    | 1                      |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  |                 |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| DE marine              | All year <sup>c</sup>                          | 1 fish of either size* |    |                                                |    |    |    |                 |    |    |    | 1 fish of either size* |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  |                 |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| MD marine              | All year                                       |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  | 1 <sup>+</sup>  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| Ches. Bay (CB) trophy  | 5/1–5/15                                       |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  |                 |  |  |  |  |  | 1 <sup>+</sup> |  |  |  |  |  |  |  |  |  |  |  |
| CB and tribs           | 5/16–5/31, 6/1–8/15 and 9/1–12/10 <sup>d</sup> |                        |    | 1 (private boat) or 2 (charter, only 1 >28")** |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  |                 |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| DC all waters          | 5/16–12/31                                     | 1                      |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  |                 |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| VA marine              | 1/1–3/31 and 5/16–12/31                        |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  | 1* <sup>+</sup> |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| CB spring              | 5/16–6/15                                      |                        |    |                                                |    |    |    | 1* <sup>+</sup> |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  |                 |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| CB fall                | 10/4–12/31                                     |                        |    |                                                |    |    |    | 1* <sup>+</sup> |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  |                 |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
| NC all waters          | All year                                       |                        |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  | 1* <sup>+</sup> |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
|                        |                                                | 18                     | 19 | 20                                             | 21 | 22 | 23 | 24              | 25 | 26 | 27 | 28                     | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | >38 |  |  |  |  |                 |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |
|                        |                                                | Total Length (inches)  |    |                                                |    |    |    |                 |    |    |    |                        |    |    |    |    |    |    |    |    |    |    |     |  |  |  |  |                 |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |

\* Non-offset circle hooks required when fishing bait

+ Spearfishing permitted, all other size and take limits apply

<sup>a</sup> Spawning areas closed 12/1–4/30 and C&R only 5/1–6/30

<sup>b</sup> The 21–24" slot is only open 4/1–5/31

<sup>c</sup> Spawning areas C&R only 4/1–5/31. 20–25" slot is only open 7/1–8/31 in Delaware River, Bay, and tribs

<sup>d</sup> C&R only 1/1–3/31, 12/11–12/31, additional area closures apply

**Figure 15.** Overview of 2022 recreational Striped Bass fishing regulations in Atlantic coast states. Additional geographic and gear restrictions apply in many of the fisheries. Figure adapted from Table 6 in ASMFC 2022.

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California Department of Fish and Wildlife  
Regulation Change Petition Evaluation

**CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE  
EVALUATION OF NOR-CAL GUIDES AND SPORTSMEN'S  
ASSOCIATION (NCGASA) PROPOSED 20-30 INCH  
HARVEST SLOT LIMIT FOR STRIPED BASS APPENDICES**

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RESULTS SUMMARY*

*APPENDIX 2: STRIPED BASS POPULATION MODEL PARAMETER INPUT  
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# **APPENDIX 1: 2022 STRIPED BASS ANGLER PREFERENCE QUESTIONNAIRE RESULTS SUMMARY**

## **1.1 Questionnaire Purpose**

In the Fall of 2020, the Nor-Cal Guides and Sportsman's Association (NCGASA) submitted a regulation change petition to the Fish and Game Commission. The proposed regulation change would restrict the harvest of Striped Bass to a "slot limit" between 20 and 30 inches for inland anadromous waters. In the summer of 2022, the NCGASA submitted a second petition which would apply the 20-to-30-inch harvest slot limit to Striped Bass caught in marine (ocean and bay) waters as well. The NCGASA petition stated that the regulation change would protect the earliest spawners as well as the largest most fecund individuals, which would then eventually increase the population size of Striped Bass. The NCGASA also stated that they had polled their membership and that there was overwhelming support for a 20-to-30-inch slot limit.

The California Department of Fish and Wildlife (CDFW) is in the process of evaluating the proposals to determine how this proposed change may affect the Striped Bass fishery, including harvest opportunities and biological processes. The Striped Bass fishery is one of the largest fisheries in California. This is because Striped Bass have a wide-spread distribution, fishing methods to target and catch Striped Bass are diverse, and anglers can fish for and catch Striped Bass year-round. Because of the popularity of the fishery, any changes to Striped Bass fishing regulations would impact many thousands of California anglers.

Part of the evaluation process included understanding and documenting anglers' general satisfaction with the Striped Bass fishery, as well as gaging angler interest in changing Striped Bass fishing regulations. To reach California's Striped Bass anglers, the CDFW developed and conducted Striped Bass Angler Preference Questionnaires (APQ) first through opportunistic in-person interviews, and then through expanded electronic questionnaires. Altogether, CDFW contacted more than 960,000 licensed anglers and assessed the data from approximately 26,000 respondents. This summary describes the data collection process and results.

## **1.2 In-person Striped Bass Angler Preference Questionnaire**

Initial in-person interviews began in November 2021 and occurred during randomly scheduled Central Valley Angler Survey (CVAS) surveys. Willing participants in the questionnaire were told that CDFW was soliciting angler input on the current Striped Bass fishery. They were not informed of the Nor-Cal Guides and Sportsman's Association (NCGASA) petition as not to bias the responses. Respondent questions were answered after the questionnaire was completed unless it was for clarification. Questionnaires consisted of nine questions, listed below. The in-person questionnaire took place between November 2021 and July 2022. A total of 211 anglers were interviewed and the results in questions 2-9 reflect the responses of 204 self-identified Striped Bass anglers.

### **1.2.1 In-person Striped Bass APQ questions and results.**

1. Do you fish for Striped Bass?
  - Yes
  - No
2. Do you support the current minimum size and bag limit?
  - Yes
  - No
3. Would you like to see the minimum size limit lower?
  - Yes
  - No
4. Would you like to see the minimum size limit higher?
  - Yes
  - No
5. Would you like to see a maximum size limit applied?
  - Yes
  - No
6. Do you support a catch and release fishery for trophy Striped Bass?
  - Yes
  - No



7. Are you associated with any professional fishing associations?

- Yes
- No

8. Are you associated with any state natural resource agency?

- Yes
- No

9. What method do you use to catch Striped Bass?

- Any
- Bait
- Lure
- Fly
- Spear

### **1.3 In-person Striped Bass Angler Preference Questionnaire Results by Question**

#### **1.3.1 Question 1. Do you fish for Striped Bass?**

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 97      | 3      | 211                 |

Anglers contacted (i.e., respondents) overwhelmingly answered that they fished for Striped Bass. If an angler answered “no” to Question 1, the questionnaire ended. If an angler answered “yes”, they moved on to Question 2. Seven respondents ended the questionnaire at Question 1.

### 1.3.2 Question 2. Do you support the current minimum size and bag limit?

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 64      | 36     | 204                 |

The majority of respondents answered that they support the current minimum size limit of 18 inches and bag limit of two fish per day (64%).

### 1.3.3 Question 3. Would you like to see the minimum size limit lower?

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 30      | 70     | 204                 |

The majority of respondents answered that they would not want to lower the minimum size limit for harvestable Striped Bass (70%).

### 1.3.4 Question 4. Would you like to see the minimum size limit higher?

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 19      | 81     | 204                 |

Most respondents answered that they would not want to raise the minimum size limit for harvestable Striped Bass (81%).

### 1.3.5 Question 5. Would you like to see a maximum size limit applied?

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 51      | 49     | 204                 |

Respondents were almost evenly split on whether they would want to see an upper size limit applied to the Striped Bass fishery.

### 1.3.6 Question 6. Do you support a catch and release fishery for trophy Striped Bass?

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 60      | 40     | 204                 |

However, respondents were generally in-favor of a catch-and-release trophy Striped Bass fishery even though that meant a maximum size limit would need to be applied.

### 1.3.7 Question 7. Are you a member of any professional fishing association?

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 10      | 90     | 204                 |

### 1.3.8 Question 8. Are you associated with any state natural resource agency?

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 3       | 97     | 204                 |

To evaluate whether the questionnaire was reaching a broad fishing community, and not just those anglers represented by professional fishing associations or natural resource agencies, anglers were asked Questions 7 and 8. In both cases, 10% or less of respondents represented the aforementioned groups, demonstrating that the questionnaire was successful in reaching a broad fishing community.

### 1.3.9 Question 9. What method do you use to catch Striped Bass?

| Artificial lure (%) | Bait (%) | Fly (%) | Spear (%) | Other (%) | Total Responses |
|---------------------|----------|---------|-----------|-----------|-----------------|
| 32                  | 64       | 1       | 2         | 1         | 204             |

Respondents were asked their primary preferred method for catching Striped Bass. They were not able to answer more than one method though it was clear that anglers often used more than one method and that this question needed to be edited. Respondents reported artificial lures as the most preferred method followed by bait, and less often fly and spear.

Results of the questionnaire indicated that the Striped Bass anglers that were interviewed by CVAS staff generally supported the current minimum size limit of 18 inches total length and did not support changing the minimum size either lower or higher than 18 inches (Questions 2-4, Section 1.2.1). Anglers were neutral on whether they wanted to see a maximum size, with respondents split nearly 50-50 on their responses (Question 5, Section 1.2.1). However, when asked if they would support a catch and release fishery for trophy sized Striped Bass, anglers were generally in favor (60% yes, Question 6, Section 1.2.1).

Comments received from anglers were recorded in a notes section of the datasheet. Comments ranged from anglers wanting smaller or larger bag limits, smaller minimum sizes, the desire for the implementation of a slot limit, and the desire to see regulations removed from Striped Bass because they are an introduced species. Additionally, many anglers reported already practicing catch-and-release fishing on large Striped Bass that they perceived as female. Lastly, despite being in favor of a catch-and-release trophy fishery, some respondents expressed concern about additional restrictions imposed with a maximum size limit. Instead, they desired other anglers to self-regulate the size of Striped Bass harvested instead of CDFW imposing a maximum size limit. This may

explain the discrepancies in the responses between questions 5 and 6 (Section 1.2.1). To reach a larger number of anglers, an electronic version of the APQ was developed.

## **1.4 Electronic Striped Bass Angler Preference Questionnaire**

An electronic questionnaire was developed using the existing in-person APQ questions as a template. The questions were reviewed by managers in Fisheries Branch, human dimensions experts in Wildlife Branch (to assess for bias), and with staff from the Office of Communication and Outreach (OCEO). Because the questionnaire was going to be reaching a larger angling constituent, the original questions were slightly changed and expanded in scope. The available platform for CDFW electronic questionnaires was Survey Monkey and could only be distributed in English because of the distribution timing. Translation services contracts were in-flux due to proximity to the new fiscal year (June-July 2022).

### **Electronic Striped Bass APQ questions with response choices.**

The electronic Striped Bass APQ was distributed through direct email, social media post, CDFW website, a press release, and through the Angler Update email newsletter.

1. Do you fish for Striped Bass?
  - Yes
  - No
2. Do you support the current minimum size?
  - Yes
  - No
3. Do you support the current bag limit?
  - Yes
  - No
4. a. Would you like to see the minimum size limit for harvest of Striped Bass:
  - <18 inches
  - >18 inches



- No change
  - No minimum size
- b. Preferred minimum size (if not 18 inches)?
- Fill in the blank
5. What length Striped Bass do you consider a trophy (in inches)?
- Fill in the blank
6. Would you support a catch and release fishery for trophy sized Striped Bass? This would require setting a maximum size/slot limit on Striped Bass that can be harvested.
- Yes
  - No
7. Are you a member of any professional fishing associations?
- Yes
  - No
8. Are you associated with any state natural resource agency?
- Yes
  - No
9. What method do you use to catch Striped Bass? (select all that apply)
- Artificial lure
  - Bait
  - Fly
  - Spear
  - Other (please specify)
10. Why do you fish for Striped Bass? (select all that apply)
- Catch and eat
  - Catch and release
  - Fishing Guide
  - Other (please specify)

The questionnaire was distributed to approximately 960,000 licensed anglers through emails stored on the CDFW Automated License Data System (ALDS) database. Licensed anglers received an electronic APQ email if they had both 1) provided an email when they purchased their fishing license, and 2) if they had purchased a fishing license in the last three years (to cut down on the volume of emails). Additionally, the updated APQ was distributed through social media, a news release, posted to the CDFW Striped Bass webpage, and through the CDFW Angler Update email newsletter. For a timeline of important APQ details, see Table 1.1.

Initially the electronic APQ was only distributed in English because the distribution timing aligned with the change of the State of California fiscal year (July 1) and new translation services contracts were in-flux. Since then, the contract has been renewed and the questionnaire was redistributed (through email and social media posts) in non-English languages which include Spanish, Tagalog, Vietnamese, Russian, Simplified Chinese, and Traditional Chinese.

**Table 1.1.** Electronic Striped Bass Angler Preference Questionnaire details. Includes how the questionnaire was distributed and when, as well as when the questionnaire was translated, and the closing date.

| Electronic Striped Bass APQ Detail                                                                                                                                                                               | Date          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Links to the APQ are posted to the CDFW Striped Bass webpages                                                                                                                                                    | 7/25/2022     |
| Electronic APQ is emailed and successfully delivered to 914,784 anglers                                                                                                                                          | 7/26/2022     |
| Social media, press release, and Angler Update newsletter are posted and sent via email                                                                                                                          | 7/28/2022     |
| The <a href="mailto:StripedBass@wildlife.ca.gov">StripedBass@wildlife.ca.gov</a> mailbox was created to answer questions; webpages updated with email contact information                                        | 8/11/2022     |
| Striped Bass town hall meeting held at Fisheries Branch headquarters                                                                                                                                             | 8/24/2022     |
| Language interpretive/translation services contract renewed, and questionnaire gets translated into 6 non-English languages (Spanish, Tagalog, Vietnamese, Russian, Simplified Chinese, and Traditional Chinese) | 8/2022-9/2022 |
| Links to the APQ are reposted to the CDFW Striped Bass webpages – non-English questionnaires are added                                                                                                           | 9/21/2022     |
| Social media posts are reposted with links to non-English questionnaires                                                                                                                                         | 9/22/2022     |
| Updated electronic APQ is emailed and successfully delivered to 945,550 anglers (added 2 additional years of emails from ALDS)                                                                                   | 9/27/2022     |
| Questionnaire closed and links were deactivated/ removed from websites                                                                                                                                           | 11/1/2022     |

## 1.5 Electronic Striped Bass Angler Preference Questionnaire Results by Question

### 1.5.1 Question 1. Do you fish for Striped Bass?

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 71      | 29     | 26,410              |

Anglers contacted (i.e. respondents) overwhelmingly answered that they fished for Striped Bass. If an angler answered “no” to Question 1, the questionnaire ended. If an angler answered “yes”, they moved on to Question 2. Approximately 10,000 respondents ended the questionnaire at Question 1.

### 1.5.2 Question 2. Do you support the current minimum size limit?

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 71      | 29     | 16,875              |

The majority of respondents answered that they support the current minimum size limit of 18 inches (71%).

### 1.5.3 Question 3. Do you support the current bag limit?

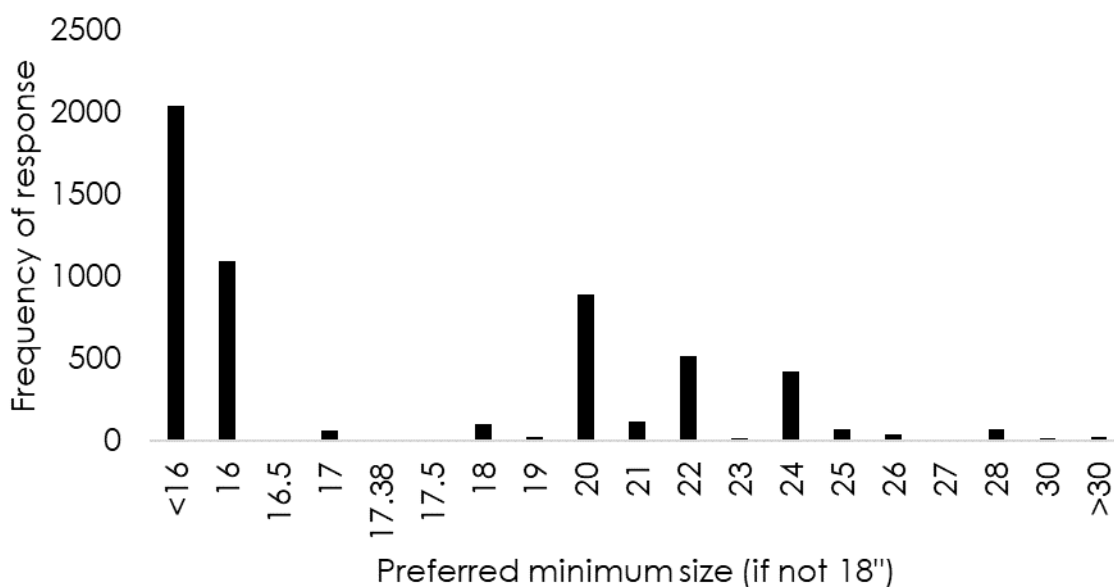
| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 68      | 32     | 16,808              |

The majority of respondents answered that they support the current bag limit of 2 fish per day (68%).

#### 1.5.4 Question 4. Would you like to see the minimum size limit for harvest of Striped Bass?

| No change (%) | No minimum size (%) | Lower than 18 inches (%) | Higher than 18 inches (%) | Number of Responses |
|---------------|---------------------|--------------------------|---------------------------|---------------------|
| 54            | 8                   | 20                       | 18                        | 16,621              |

Approximately half of anglers contacted preferred the current minimum size limit of 18 inches (54%). Most of the remaining respondents were split on whether they supported lowering the minimum size limit below 18 inches (20%) vs. increasing it above 18 inches (18%). A small fraction of respondents (8%) supported no minimum size limit. Anglers had the option to write in a preferred minimum size if not 18 inches. This portion of Question 4 received 5,527 fill-in-the-blank responses summarized in Figure 1.1. Of the anglers that wrote in preferred minimum size limits, 58% of anglers would prefer a smaller than 18-inch minimum size limit (Fig. 1.1).

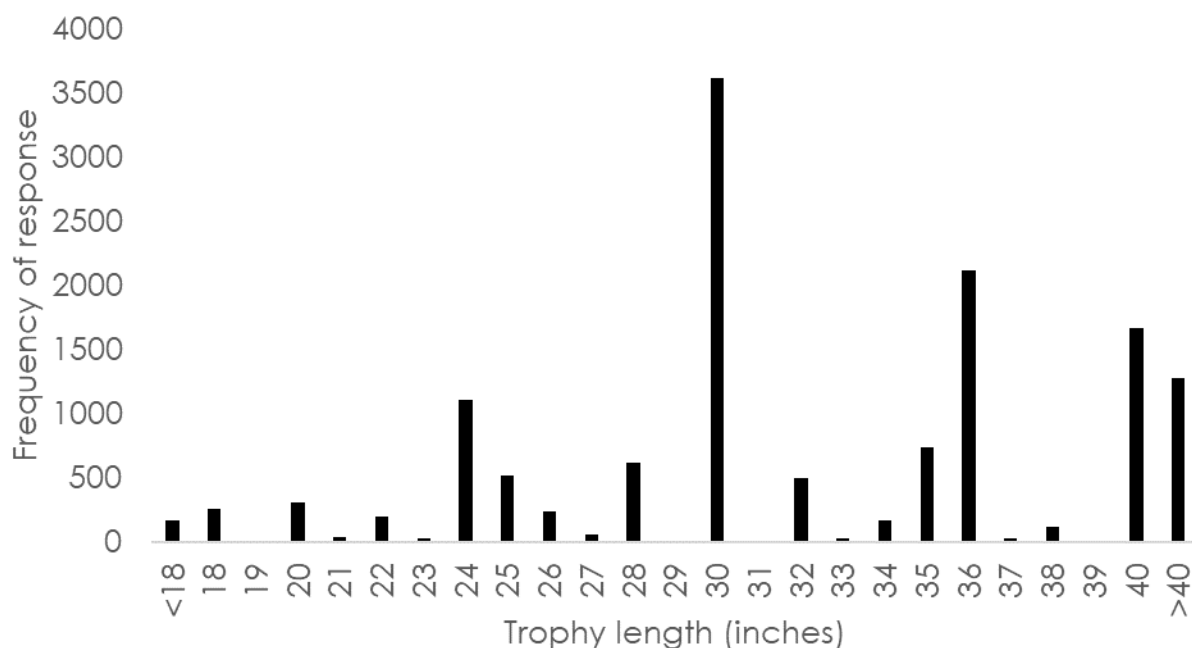


**Figure 1.1.** There were 5,527 written responses for preferred minimum sizes other than the current 18-inch minimum size (although some respondents entered 18 inches as their preference).



### 1.5.5 Question 5. What length Striped Bass do you consider a trophy?

This question was a fill-in-the-blank question. The responses are summarized in Figure 1.2. There were 13,887 responses to Question 5.



**Figure 1.2.** Fill-in-the-blank responses to what size Striped Bass anglers considered a trophy.

Responses show that anglers consider a wide range of sizes to be trophies, with 30 inches (26%), 36 inches (15%), and 40 inches or greater (21%) as the most frequent responses.

### 1.5.6 Question 6. Would you support a catch and release fishery for trophy sized Striped Bass? This would require setting a maximum size/slot limit on Striped Bass that can be harvested.

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 64      | 36     | 16,797              |

Anglers overwhelmingly supported the implementation of a maximum size limit on harvestable Striped Bass (64%).

#### 1.5.7 Question 7. Are you a member of any professional fishing association?

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 9       | 91     | 16,873              |

#### 1.5.8 Question 8. Are you associated with any state natural resource agency?

| Yes (%) | No (%) | Number of Responses |
|---------|--------|---------------------|
| 4       | 96     | 16,836              |

To evaluate whether the questionnaire was reaching a broad fishing community, and not just those anglers represented by professional fishing associations or natural resource agencies, anglers were asked Questions 7 and 8. In both cases, less than 10% of respondents represented the aforementioned groups, demonstrating that the questionnaire was successful in reaching a broad fishing community.

#### 1.5.9 Question 9. What method do you use to catch Striped Bass?

| Artificial lure (%) | Bait (%) | Fly (%) | Spear (%) | Other (%) | Total Responses |
|---------------------|----------|---------|-----------|-----------|-----------------|
| 47                  | 42       | 10      | <1        | <1        | 28,524          |

This question was asked to understand the general methodologies that anglers use to catch Striped Bass and to identify potential methodologies that may be affected by regulation changes (i.e., slot limits). Anglers could choose more than one option (select all that apply), which is why the total number of responses is higher than in previous questions. Artificial lures (47%) and bait (42%) are the most common methods used to catch Striped Bass.

### 1.5.10 Question 10. Why do you fish for Striped Bass?

| Catch and Eat (%) | Catch and Release (%) | Fishing Guide (%) | Other (%) | Total Responses |
|-------------------|-----------------------|-------------------|-----------|-----------------|
| 51                | 42                    | 1                 | 6         | 23,812          |

This question was asked to understand how and why anglers utilize the Striped Bass fishery. Anglers could choose more than one option (select all that apply), which is why the total number of responses is higher than in previous questions. Responses to Question 10 indicate that anglers primarily utilize the Striped Bass fishery for a food resource (51%, catch and eat), followed by for sport (42%, catch and release). Less common responses to this question included: occupation, time in nature, family bonding, and species protection/predator control. Combined, these responses accounted for less than 8% of total responses.

## 1.6 Striped Bass Angler Preference Questionnaire Summary

Despite being an introduced species and an opportunistic predator, Striped Bass represent one of the largest fisheries in California. Angler Preference Questionnaires were used to quantitatively describe anglers' sentiment towards the fishery. The questionnaire was distributed to over 900,000 licensed California anglers, and more through social media posts, resulting in an unprecedented 26,000 responses and more than 16,000 completed questionnaires.

In general, Striped Bass anglers that took either the in-person APQ and/or the electronic APQ (there is most likely overlap), were supportive of the current Striped Bass fishing regulations (Table 1.1, Questions 2-4; Table 1.2, Questions 2-4). However, given the opportunity for change, anglers' preferences for the Striped Bass fishery varied widely.

Though 54% of anglers would prefer to see no changes made to the minimum size of harvestable Striped Bass, 20% of anglers would like to see the minimum size lowered (Table 1.2, Question 4). Written responses for "preferred minimum size if not 18 inches" showed that a minimum size of 16 inches or less was preferred for 57% of respondents (Figure 1.1).

There was also general support for a catch-and-release trophy Striped Bass fishery (Table 1.1, Question 6; Table 1.2, Question 6), even though that would mean setting a maximum size limit on harvestable Striped Bass (implementing a slot limit). This response indicates that anglers would support restricting the maximum size of harvestable Striped Bass to achieve protection for larger Striped Bass. In fact, written comments from respondents indicate that many anglers already practice catch-and-release fishing on “large” Striped Bass. The implementation of a maximum size limit would ensure that all anglers followed this practice. When asked what size defined a trophy Striped Bass, responses ranged widely (Figure 1.2), with 30, 36, and >40 inches reported most frequently.

Though opinions varied on how anglers would change the Striped Bass fishery, what was clear was that anglers value the fishery for both food and sport (Table 1.2, Question 10), and any changes to Striped Bass fishing regulations will impact thousands of anglers.

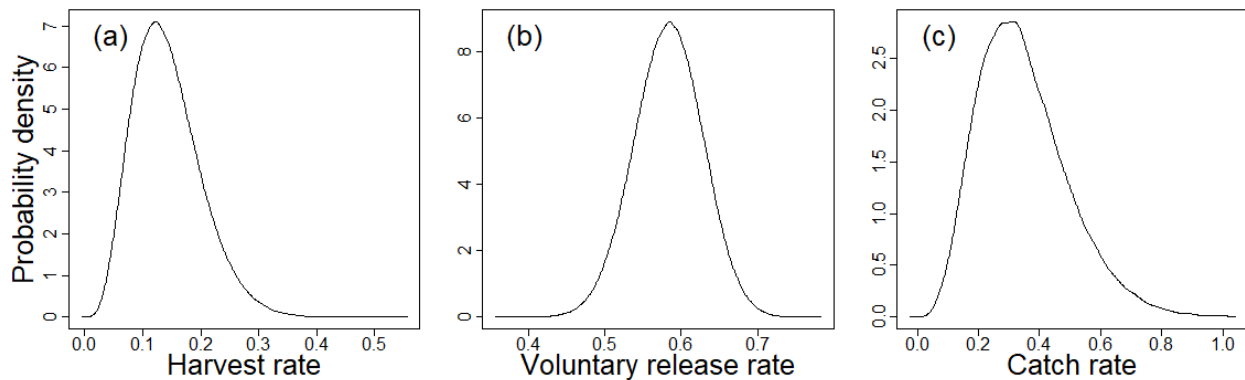
Information obtained from Striped Bass Angler Preference Questionnaires will be incorporated into the regulation change petition evaluation completed by CDFW. The evaluation will include a biological assessment of the fishery, potential impacts that the regulation change may have on the fishery and California anglers, as well as anglers' perspectives on the Striped Bass fishery. Together these components will shape CDFW's assessment of the regulation change petition which is expected in summer 2024.

## APPENDIX 2. STRIPED BASS POPULATION MODEL PARAMETER INPUT JUSTIFICATIONS

### 2.1 Fishery Inputs

#### 2.1.1 Harvest ( $U$ ) and capture rate ( $\dot{U}$ ) of fish vulnerable to angling

There are no recent published estimates of harvest rates ( $U$ ) of Striped Bass on the west coast of the U.S.A. Thus, we chose a range of  $U$  to represent lower plausible bounds of exploitation and upper plausible bounds that are likely to lead to overfishing. We represented the uncertainty in  $U$  with a beta distribution parameterized with an  $\alpha = 5$  and  $\beta = 30$ . This resulted in a mean  $U$  of 0.14 and 95% probability between 0.05 and 0.27 (Fig. 2.1). This distribution included the range of historic published estimates of  $U$  on the west coast of 0.12-0.19 for 1965 to 1978 (Sommani 1972, Miller 1974), unpublished estimates from CDFW's adult Striped Bass mark-recapture study of 0.04-0.29 (2011-2022), as well as estimates from the Atlantic coast stock assessment from 2011 to 2021 of 0.13-0.32 (2022 ASMFC). It results in a 0.35 and 0.24 probability of  $U$  greater than the Atlantic coast management target and threshold of 0.16 and 0.18, respectively (2022 ASMFC).



**Figure 2.1.** Probability distributions of parameter values for (a) harvest, (b) voluntary release rate, and (c) catch rates used to inform  $U$ ,  $\delta$ ,  $\dot{U}$  (respectively) in the model.



We informed the capture rate  $\dot{U}$  indirectly with estimates of voluntary release rates of Striped Bass ( $\delta$ ) as  $\dot{U} = U / (1 - \delta)$  because  $\delta$  is easier to inform than  $\dot{U}$ . We represented  $\delta$  with a beta distribution with an  $\alpha = 70$  and  $\beta = 50$ , resulting in a mean voluntary release rate of 0.58 with 95% probability between 0.49 and 0.67 (Fig. 2.1). This range represents current patterns of voluntary catch and release practices by recreational anglers in the Sacramento-San Joaquin Delta and tributaries reported by CVAS ( $\dot{U} = 0.74$ -0.90), is consistent with the total release rates between 0.43 and 0.75 for Striped Bass reported through the California Recreation Fisheries Survey (CRFS, sourced from Recreational Fisheries Information Center [RecFIN]), and through commercial passenger fishing vessels (CPFV) guide logbook records for the Pacific Oceans and San Francisco Estuary ( $\dot{U} = 0.14$ -0.58) (Table 2.1). Furthermore,  $\delta$  results in model outputs of total release (i.e., the sum of voluntary and legally mandated release) that approximate patterns among  $\delta$ ,  $U$ , and  $\dot{U}$  reported for Atlantic Striped Bass stocks (2022 ASMFC). The distribution of angler capture rates that resulted from the specified  $U$  and  $\delta$  parameters had mean of 0.35 with 95% probability between 0.12 and 0.69 (Fig. 2.1).

**Table 2.1.** Estimated harvest rates and literature sources for Striped Bass recreational fisheries.

| Source                                                 | Harvest rates |
|--------------------------------------------------------|---------------|
| Miller (1974)                                          | 12-19%        |
| Sommani (1972)                                         | 9.6-17.6%     |
| 2022 ASMFC                                             | 13-32%        |
| CDFW Adult Tagging Program<br>(2011-2022; unpublished) | 4-29%         |

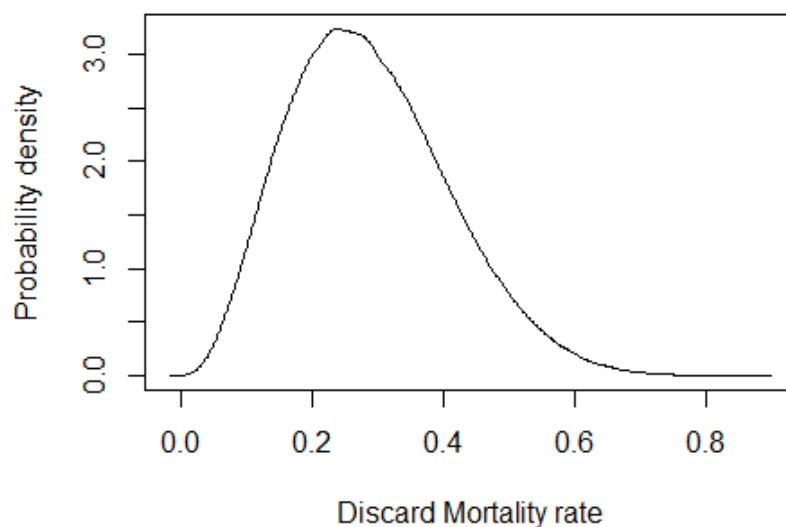
### 2.1.2 Discard mortality rate

Published mortality rates of captured and released Striped Bass by anglers range between <1% to 67% and can depend on fishing practices (Table 2.2). Because actual angling practices occur in less controlled environments than discard mortality studies, it is likely that this range underrepresents the true levels of discard mortality (e.g., Tenningen et al., 2021). Thus, we specified discard mortality rates with a beta distribution parameterized with an  $\alpha = 3.75$  and  $\beta = 9.25$  (Fig 2.2). This specification resulted in a mean discard mortality rate of 0.29 and 95% probability range between 0.09 and 0.55, encompassing discard rates

in the literature (Table 2.3), those applied in 2022 ASMFC (i.e., 37%), and representing common discard mortality rates applied in stock assessments of a variety of large-bodied marine fisheries (Z et al., 2014).

**Table 2.2.** Estimated voluntary release rates and data/literature sources for Striped Bass recreational fisheries.

| Data                           | Source                                                                    | Release rates |
|--------------------------------|---------------------------------------------------------------------------|---------------|
| CRFS 2005-2022                 | RecFIN<br>( <a href="https://www.recfin.org">https://www.recfin.org</a> ) | 43-75%        |
| CPFV logbook records 1995-2020 | CDFW Marine Logs System                                                   | 14-58%        |
| CVAS 1991-2016                 | Wixom et al. 1995; CDFW 2021                                              | 74-90%        |



**Figure 2.2.** Probability distribution of parameter values for discard mortality rate used to inform  $D$  in the model.

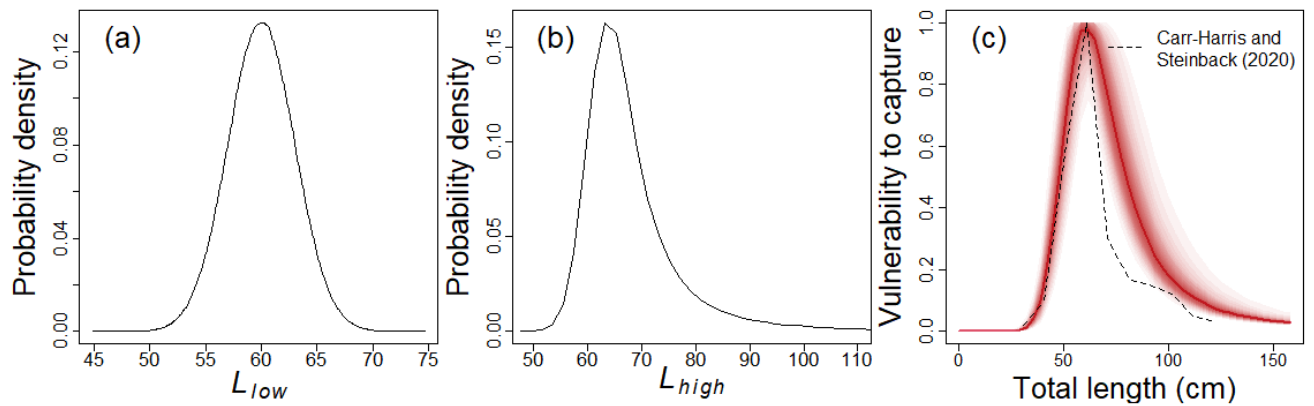
**Table 2.3.** Estimated discard mortality rates and literature sources for Striped Bass recreational fisheries.

| Source                      | Release mortality rates |
|-----------------------------|-------------------------|
| Harrell (1988)              | 15.6-30.7%              |
| Hysmith et al. (1993)       | 38%                     |
| Diodati and Richards (1996) | 3-26%                   |
| Nelson (1998)               | 6-27%                   |
| Bettoli and Osborne (1998)  | 14-67%                  |
| Lukacovic and Uphoff (2002) | 0.8-9%                  |
| Millard et al. (2003)       | 8-18%                   |
| May (1990)                  | 26-30%                  |
| Childress 1989a,b           | 22-27%                  |
| Millard et al. (2005)       | 9-23%                   |

### 2.1.3 Length-based vulnerability to capture.

Variation in length-based vulnerability to capture can result from complex interactions among fishery and fish characteristics (O'Boyle et al. 2016, Patterson et al. 2012, Garner et al. 2014, Micah et al. 2021). Selectivity patterns of Striped Bass are likely governed by variation in fishing practices targeting harvest versus trophy catch as well as the relative spatial and temporal distribution of angling effort relative to ontogenetic shift in the spatial distribution of fish and temporal migration patterns. Carr-Harris and Steinback (2020) estimated a single strongly dome-shaped selectivity curve for Chesapeake Bay and Atlantic coast Striped Bass fisheries that closely aligns with the strong dome shaped selectivity's of other large-bodied recreational fish species, including red snapper, grey trigger fish and Murray cod (2010 SEFSC, Patterson et al. 2012, Garner et al. 2014, Garner et al. 2017, Gwinn et al. 2019, Micah et al. 2021). Thus, we specified a strongly dome shaped selectivity pattern similar to Carr-Harris and Steinback (2020) with greater uncertainty in the vulnerability of larger fish to capture. We represented the selectivity pattern with a double logistic model with lower lengths at 50% vulnerability to capture ( $L_{low}$ ) drawn from a normal distribution

with  $\mu = 60$  and  $\sigma = 3$ . This resulted in a 95% probability between 54 cm and 66 cm (Fig. 2.3a). The upper length at 50% vulnerability to capture ( $L_{high}$ ) was modeled as  $L_{high} = L_{low} + \Delta$ , where  $\Delta$  was drawn from a log-Normal distributions with  $\mu = \log(5)$  and  $\sigma = 1$ . This resulted in  $L_{high}$  with a mean of 68 cm and 95% probability between 57 cm and 96 cm (Fig. 2.3b). We specified the standard deviation of the double logistic model as the product of a coefficient of variation of 0.15 and the length of the fish (i.e.,  $\sigma_{\text{logit}} = cv * L$ ). To ensure that the maximum capture probability did not fall below a value of 1, we scaled the vulnerability curve by dividing the outputs by the maximum probability in each growth-type-group. This resulted in a mean  $L_{low}$  of 48 and  $L_{high}$  of 79 (Fig. 2.3c).



**Figure 2.3.** Probability distributions of parameter values for (a) lower length at 50% vulnerability to capture and (b) upper length at 50% vulnerability to capture used to inform the vulnerability of fish of length  $L$  to capture (c). The bold red line in panel (c) represents the length-based capture probability used in the model compared to capture probabilities modeled for Atlantic Striped Bass (dashed line; Carr-Harris and Steinback 2020). Light red lines represent the standard deviation of the capture probability for Pacific Striped Bass, indicating greater uncertainty in the vulnerability of larger fish to capture.

## 2.2 Life History Inputs

### 2.2.1 Length at age

A total of 21 growth-type-groups were simulated, following procedures in Gwinn et al. (2015). In brief, asymptotic length for each growth-type-group  $g$  for each sex  $s$  ( $L_{\infty,g,s}$ ) was assigned at evenly spaced intervals between  $L_{\infty,min}$  and  $L_{\infty,max}$  (Table 2.4) for a total equal to the number of growth-type-groups. Values for  $L_{\infty,min}$  and  $L_{\infty,max}$  were set as  $\pm 20\%$  of the mean asymptotic length  $\bar{L}_{\infty}$  (Table 2.4), which approximates the 95% probability range of a normal distribution with a means of  $\bar{L}_{\infty}$  and a standard deviation of 10% of the mean. The proportion of fish recruiting to each growth-type-group  $g$  for each sex  $s$  ( $p_{g,s}$ ) was specified as the normal probability density of  $L_{\infty,g,s}$ , with a mean of  $\bar{L}_{\infty}$  and a standard deviation 10% of  $\bar{L}_{\infty}$  (Gwinn et al. 2015; Walters and Martell 2004).

**Table 2.4.** Mean and 95% probability of minimum and maximum asymptotic lengths for growth-type-group assignments.

| Parameter                 | Average length<br>(cm) | 95% probability at<br>2.5% | 95% probability at<br>97.5% |
|---------------------------|------------------------|----------------------------|-----------------------------|
| $L_{\infty,min}^{female}$ | 106.3                  | 93.4                       | 121.3                       |
| $L_{\infty,max}^{female}$ | 159.5                  | 140.1                      | 181.9                       |
| $L_{\infty,min}^{male}$   | 96.8                   | 85.2                       | 109.8                       |
| $L_{\infty,max}^{male}$   | 145.2                  | 127.9                      | 165                         |

### 2.2.2 Length-weight relationship.

Length-weight parameters were estimated with a standard length-weight regression fit to data collected during creel surveys (Wixom et al. 1995; CDFW 2021) conducted from 1991-2016 in the San Francisco estuary and Sacramento-San Joaquin Delta. Length-weight parameters were estimated as  $\alpha = 4.8 * 10^{-5}$  and  $\beta = 2.7$  for males and  $\alpha = 2.7 * 10^{-5}$  and  $\beta = 2.8$  for females.



### 2.2.3 Von Bertalanffy growth parameters and Length-at-maturation

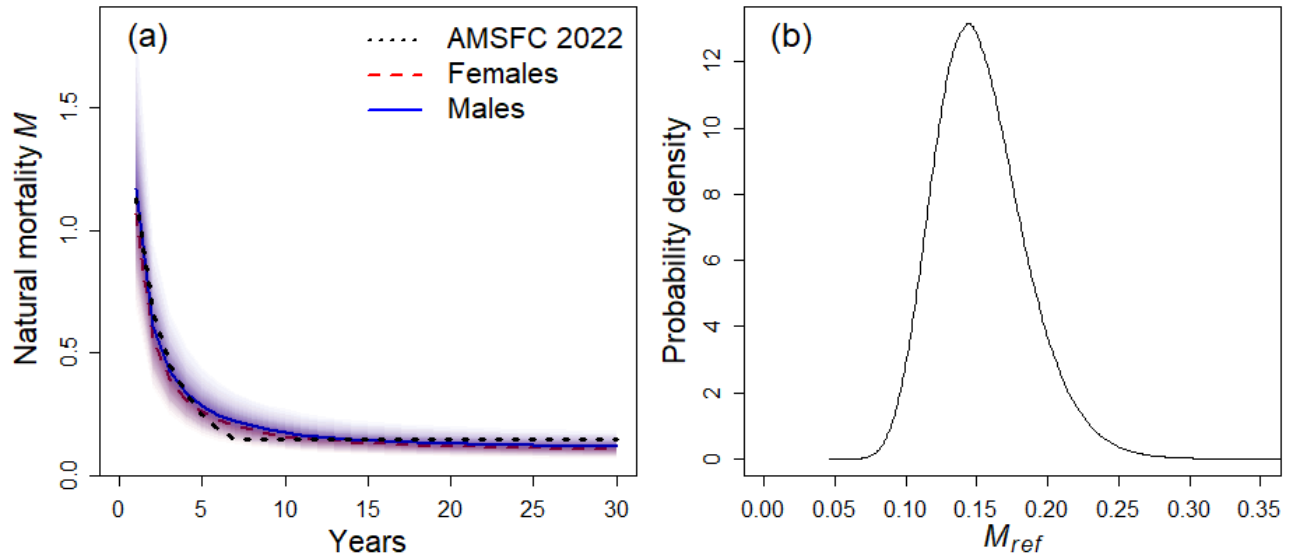
Growth and maturation rates of Striped Bass are known to be sex specific, with females growing to larger sizes and maturing at larger sizes and ages than males (Robinson 1960, Mansueti 1961, Turner and Kelley 1966). To account for these differences, we estimated von Bertalanffy growth parameters (Bertalanffy 1938) using an existing long-term fishery-independent length and age data set collected between 1969 and 2009 (total sample size of 250,125). Data were collected with fyke nets and experimental gill nets in the Sacramento-San Joaquin River Delta and tributaries, providing representation of a broad range of sizes and ages (Danos et al. 2020). The growth model was specified with common  $t_0$  and  $k$  parameters and a sex-specific  $L_\infty$  parameters, and fit with a Normal likelihood via maximum likelihood methods. This analysis resulted in maximum likelihood estimates of  $t_0 = -1.4$ ,  $k = 0.1$  (95% probability between 0.08 and 0.13),  $L_\infty^{male} = 121$  cm (95% probability between 106.6 cm and 137.5 cm), and  $L_\infty^{female} = 132.9$  cm (95% probability between 116.8 cm and 151.6 cm). The mean length at maturation ( $L_{mat}$ ) was set to 35.1 cm for males (95% probability between 30.5 cm and 40.5 cm) and 58 cm for females (95% probability between 50.5 cm and 67 cm), which approximates maturation at 2 years for males and 4-5 years for females (Coutant 1986, Scofield 1930, Calhoun et al. 1948).

### 2.2.4 Natural mortality

Natural mortality  $M$  is difficult to measure directly (Vetter 1988), and there are no known estimates of age-specific  $M$  for Striped Bass on the west coast. Thus, we modeled natural mortality as size-dependent following Lorenzen (2000):

$$M_{a,g,s} = M_{ref} \left( \frac{L_{ref}}{L_{a,g,s}} \right),$$

where  $L_{ref}$  is a reference length where the natural mortality rate is known to be a given value (i.e.  $M_{ref}$ ). We inform  $L_{ref}$  using the natural mortality schedule given for Atlantic Striped Bass in recent stock assessments by adjusting  $L_{ref}$  to mirror the Lorenzen mortality curve at  $M_{ref} = 0.15$  (2022 ASMFC). This resulted in  $L_{ref} = 90$  cm for males and females, with a mean  $M$  of 0.15 and a 95% probability between 0.10 and 0.22 (Fig. 2.4).



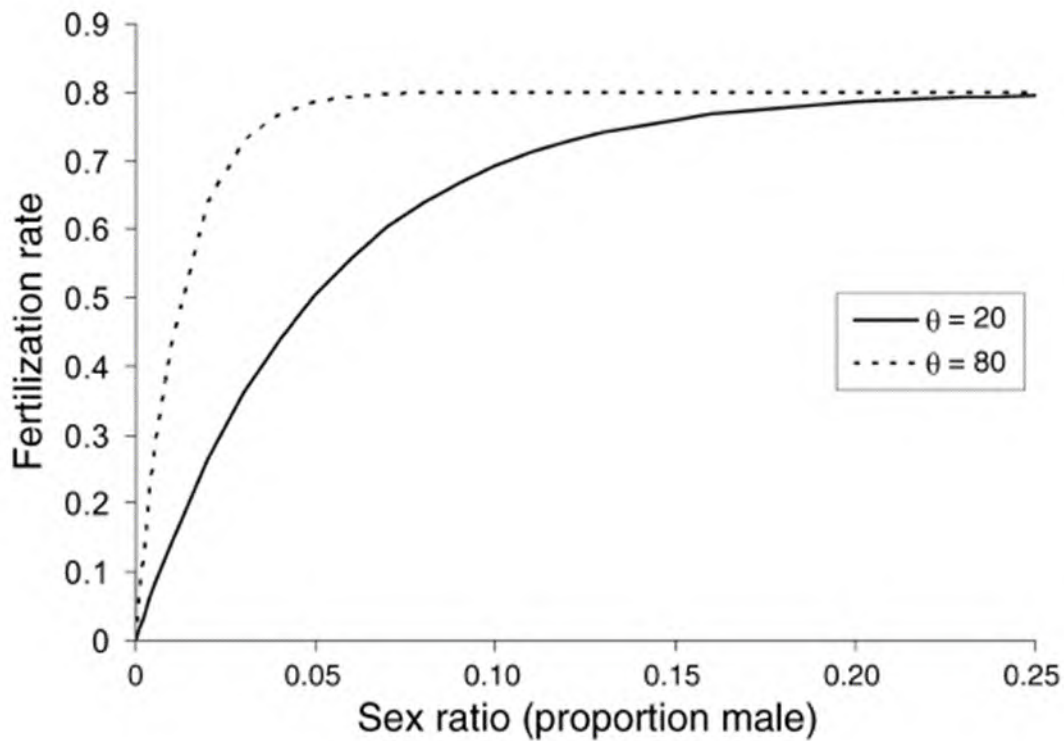
**Figure 2.4.** Sex-specific natural mortality-at-age estimates for Pacific Striped Bass (bold blue line and dashed red line) compared to natural mortality reported for Atlantic Striped Bass (dotted line; 2022 ASMFC) (a). Panel (b) describes the probability distribution of parameter values for  $M_{ref}$  used to inform natural mortality  $M$ .

## 2.3 Reproduction and Recruitment Inputs

### 2.3.1 Compensation Ratio (CR), scaling parameter ( $R_0$ ), and fertility function ( $\theta$ )

The parameter  $CR$  is the Goodyear compensation ratio (Goodyear 1977, 1980) that describes the maximum relative increase in juvenile survival as the total fecundity is reduced from the unfished biomass ( $\varphi_0$ ) to near zero. There are no available estimates of  $CR$  for Pacific Striped Bass; however, Meyers et al. (1999) reports a value of  $CR = 18.2$  for the species and the recent stock assessment of Atlantic stocks estimated and applies a value of  $CR = 6$  (2022 ASMFC). We applied a mean value of  $CR = 11.6$  in our Monte Carlo process based on the Fishlife analysis updated with the estimates of Myers et al. (1999) and 2022 ASMFC. This resulted in a 95% probability of  $CR$  between 4.4 and 25.8. Because  $R_0$  is a scaling parameter that does not influence the comparison of alternative regulations, we set it to  $R_0 = 1$  to present results on a 'per-recruit' scale.

The term  $\theta$  (Eq. 2) was used investigate the interaction of fertility and sex ratio at various levels, ranging from  $\theta = 20$  (representing a “low fertility” function) to  $\theta = 80$  (representing a “high fertility” function) (Heppell et al. 2006; Fig. 2.5). Values for  $\theta$  were drawn from a random uniform distribution, which resulted in a mean of 50.4 and 95% probability between 22 and 78.



**Figure 2.5** Model relationship between fertilization rate and sex ratio (proportion of males) based on two different levels of fertility function,  $\theta$  (Fig.3 from Heppell et al. 2006).

# **APPENDIX 3: CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE'S STRIPED BASS DIET, FORAGING BEHAVIOR, AND PREDATION LITERATURE REVIEW**

## **3.1 Literature Review Purpose**

In the Fall of 2020, the Nor-Cal Guides and Sportsman's Association (NCGASA) submitted a regulation change petition to the Fish and Game Commission. The proposed regulation change would restrict the harvest of Striped Bass to a "slot limit" between 20 and 30 inches for inland anadromous waters. In the summer of 2022, the NCGASA submitted a second petition which would apply the 20-to-30-inch harvest slot limit to Striped Bass caught in marine (ocean and bay) waters as well. The NCGASA petition stated that the regulation change would protect the earliest spawners as well as the largest most fecund individuals, which would then over time, increase the population size of Striped Bass. The NCGASA also stated that they had polled their membership and that there was overwhelming support for a 20-to-30-inch slot limit. In response to the petition filing, the California Department of Fish and Wildlife (CDFW) began compiling and reviewing the available science to evaluate the efficacy of the science presented in the proposal. The goal of this literature review is to understand trends in the Striped Bass population, trends in inland and marine fisheries, and impacts that the proposed slot limit may have on listed species (if any) through predation.

During the evaluation process, several questions arose which necessitated a literature review which specifically focused on Striped Bass diet, foraging behavior, and predation. The review was needed to better understand how diet and feeding behavior of Striped Bass could vary temporally, spatially, by life-stage, and sex. The review also included pertinent literature that discussed factors that may influence feeding behaviors including environmental conditions, Striped Bass migration and distribution, and predator-prey abundance, among others.

The information included in the literature review included: study funding source (if listed and/or easily discernable), study period, geographic range, predator and prey assemblages evaluated/detected by the study, key findings from the study, and an overall take away from the paper. Information listed in the "key findings" and "overall" sections of the review include text taken directly from the

document that was reviewed as well as text that reflects the opinions of the reviewer. Final impressions and findings from this literature review will inform and be presented in the CDFW evaluation of the NCGASA slot limit proposal document. This review is a living document and will be updated as new research is conducted and literature published.

## 3.2 General Striped Bass diet and foraging behavior

### Loboschefskey et al. 2012

Loboschefskey, E., G. Benigno, T. Sommer, K. Rose, T. Ginn, A. Massoudieh, and F. Loge. 2012. Individual-level and Population-level Historical Prey Demand of San Francisco Estuary Striped Bass Using a Bioenergetics Model. San Francisco Estuary and Watershed Science 10(1).

**Funding Source.** DWR and IEP.

**Study Period.** Dates ranging between 1969-2004 were selected because it was a composite study to create a model and not a study to collect data.

**Geographic Range.** San Francisco Estuary.

**Predator assemblage evaluated.** Sub-adult (age 1 and 2) and adult (age 3+) Striped Bass.

**Prey species detected.** Diet analysis was compiled from many sources and over different time scales. Prey item categories included: fish, decapod/isopods, mysids, and "other".

#### **Key Findings.**

- Quantified the individual and population-level consumption by Striped Bass.
- Mean length at age, and subsequent calculated mean weight began to decrease in the early 1990s for fish older than age 4.
- Adult Striped Bass diet consisted primarily of prey fish during all time-periods analyzed and was not observed to change significantly over time.

- Sub-adult Striped Bass became more piscivorous during the study period beginning in 1990, with a commensurate decline in the proportion of mysids in their diet. Prey fish increased from 2.5% to 12.2% in the diet of age one and from 78.5% to 82.1% in the diet of age two between 1980 and 1990, and mysids in the diets decreased from 95.9% to 58.5% and from 18.4% to 8.4%.
- Sub-adult population total consumption was variable from year to year and was statistically correlated to the sub-adult abundance estimates for age one.
- Adult population total consumption was statistically correlated to Striped Bass abundance estimates.
- From 1990 through 2001, piscivorous predation rates increased coincident with higher population numbers of adult Striped Bass and sub-adults.

**Overall.** This study found that individual consumption by adult females was higher than adult males at comparable age-classes. This may be because of the larger sizes and growth rates of females than of males, and the higher energetic cost of spawning in females than in males. One of the key findings of this paper is that population total consumption by sub-adult Striped Bass was similar to the population total consumption by adult Striped Bass. While the individual total consumption by adults was greater than that of the sub-adults, the larger sub-adult population abundance resulted in very similar total consumption (e.g., mean =  $18.1 \times 10^6$  kg prey for sub-adults versus  $17.9 \times 10^6$  kg prey for adults). Prey located outside of the estuary represents an unknown percentage of the estimated total prey consumed by adults. By contrast, since sub-adults primarily reside in the estuary, and since the simulations showed that this demographic frequently consumes more than adults, sub-adults have a particularly large consumption demand within the estuary. Sub-adult Striped Bass can be highly abundant in shallow-water habitat (Nobriga and Feyrer 2007). A high percentage of prey consumed by sub-adult Striped Bass may originate inshore rather than in pelagic habitat.



## **Nobriga and Feyrer 2008**

Nobriga, M., and F. Feyrer. 2008. Diet composition in San Francisco Estuary Striped Bass: does trophic adaptability have its limits? Environmental Biology of Fishes. DOI 10.1007/s10641-008-9376-0.Funding Source.

**Funding Source.** DWR and the CALFED Science Program.

**Study Period.** Used data collected from Stevens 1966 (1963-1964) and Nobriga and Freyrer 2007 (2001-2003), excluding winter samples from Stevens to make data sets temporally comparable.

**Geographic Range.** Sacramento San Joaquin Delta (16 sites).

**Predator assemblage evaluated.** Striped Bass diets.

**Prey species detected.** Variable, but focused on Inland Silverside, Threadfin Shad, and decapod shrimp.

### **Key Findings.**

- This study examined trophic adaptability, as changes in diet over time shifted with prey availability.
- Results indicate that Striped Bass could effectively incorporate new prey into their diet at an intermediate time scale between one to two years. This was observed by Stevens 1966 after Threadfin Shad established populations in the San Francisco Estuary and were identified as a new prey source in the early 1960s.
- Threadfin Shad was a close second in importance to cannibalized Striped Bass as a prey fish and remained at similar frequencies in Striped Bass stomachs 40 years later.
- Logistic regression models for the three prey taxa tested showed their presence-absence in Striped Bass stomachs was significantly affected by both prey density and predator length. Larger Striped Bass (>400 mm FL) were less likely to consume smaller prey fishes such as Inland Silverside, and more likely to consume Threadfin Shad and decapod shrimp.
- Striped Bass and Mysid shrimp often form a predator-prey association in estuaries, and there is evidence to suggest that San Francisco

Estuary (SFE) Striped Bass productivity has declined in part because Mysid shrimp productivity has declined.

**Overall.** SFE Striped Bass exhibited, and continue to exhibit, considerable trophic adaptability. Striped Bass have adapted by incorporating certain prey into their diet as prey were introduced and rose to prominence in the estuary's faunal assemblage. They speculate that as continued species introductions push the SFE food web further away from a pre-existing state, it is increasingly unlikely that Striped Bass will find a suite of invading 'alternate prey' that can fully replace their established historical prey which may lead to declines in Striped Bass productivity.

## Stevens 1966

Stevens, D.E. 1966. Food habits of Striped Bass, *Morone saxatilis*, in the Sacramento–San Joaquin Delta. California Department of Fish Game Fish Bulletin 136:68–96.

**Funding Source.** Delta Fish and Wildlife Protection Study through DWR and the California Water Bond Act.

**Study Period.** September 1963 through August 1964.

**Geographic Range.** Sacramento-San Joaquin Delta.

**Predator assemblage evaluated.** Striped Bass food habits (n= 8,628 stomachs).

**Prey species detected.** Various aquatic macroinvertebrate and fish species (see key findings below). Percentages reported below represent average % by volume across seasons (see Tables 5, 6, 7, and 8 in document)

### Key Findings.

- Data were analyzed by frequency of occurrence in the stomachs and percent of diet by volume.
- Young bass between 5-12 cm (September 1963) and 12-23 cm (August 1964) consumed crustaceans (56%), insects (trace), mollusks (1%), Threadfin Shad (36%), and small Striped Bass (12%).

- Juvenile bass between 13-25 cm (September 1963) and 24-35 cm (August 1964) consumed crustaceans (14%), Threadfin Shad (31%), Striped Bass (18%), American Shad (3%), Delta Smelt (listed as pond smelt in document, 5%), King Salmon (spring and summer) (2%), insects (trace), and mollusks (trace).
- Sub-adult bass between 26-37 cm (September 1963) and 36-47 cm (August 1964) consumed Threadfin Shad (43%), Striped Bass (35%), unidentified fishes (10%), American Shad (1%), King Salmon (spring and summer) (3%), and crustaceans (4%).
- Adult bass longer than 38 cm (September 1963) and longer than 48 cm (August 1964) were considered at least three years old. Their diet included Striped Bass (45%), unidentified fishes (6%), Threadfin Shad (26%), American Shad (4%), Delta Smelt (trace), King Salmon (spring) (1%), and crustaceans (trace).
- King Salmon were observed in the diets of sub-adult (fall and spring) and adult Striped Bass (spring) in the lower San Joaquin River, but not in the middle or upper San Joaquin River.
- Diets of Striped Bass caught in the south delta were dominated by crustacean species for young through sub-adult Striped Bass. Adult diets were dominated by fishes, primarily other Striped Bass and Threadfin Shad.

**Overall.** Five items frequently occurred in the diets of Striped Bass of any age, including Mysid shrimp, amphipods, small Striped Bass, Threadfin Shad, and discarded or stolen sardine and anchovy bait. Young Striped Bass were one of the important foods of adult and sub-adult bass. In the fall, they were discovered in two-fifths of sampled sub-adults and adults' stomachs. In the winter and spring, as the young bass became less abundant and larger, they were eaten less frequently. In the summer, when the new year-class of young bass became available, there was a sharp increase in the percentage of the sub-adults and adults that had eaten small bass. These new young-of-the-year bass were also of importance as a food of juvenile bass.

## Thomas 1967

Thomas, J.L. 1967. The Diet of Juvenile and Adult Striped Bass *Roccus Saxatilis*, in the Sacramento-San Joaquin River System. Cal Fish and Game 53(1):49-62.

**Funding Source.** Federal Aid to Fish Restoration Funds (Dingell-Johnson Project California).

**Study Period.** Incidental collection took place between 1957-1960. In 1961, the Young of Year (YOY) were collected monthly. In 1962, both juveniles and adults were collected monthly.

**Geographic Range.** (i) San Francisco Bay (SFB), (ii) San Pablo Bay, (iii) Sacramento River and bays from Crockett to Pittsburg, (iv) Delta, (v) Lower Sacramento River, and (vi) Upper Sacramento River.

**Predator assemblage evaluated.** Striped Bass only.

**Prey species detected.** Both vertebrates and invertebrates were collected (see Table 2 in Thomas 1967). Prey detected included Chinook Salmon.

**Key Findings.** Results are presented by season, location, and size class, and are reported as frequency of occurrence and percentage volume. Below is a summary of detected prey species size classes with volume reported.

- Adults (> 16 inches).
  - Spring diet largely consisted of Shiner Perch (50%) and anchovies (34%). Individuals were found in the SFB.
  - Summer diet largely consisted of Northern Anchovies and Shiner Perch. Individuals were found in the SFB.
  - Fall diet largely consisted of Northern Anchovies and Shiner Perch (>50% by volume combined), Pacific Tomcod and herring (22% by volume combined). Young Striped Bass also appeared in the diet. Individuals were found in the Delta.
- Juveniles (size group not stated, assuming < 16 inches).
  - Spring diet largely consisted of King Salmon (65%). Individuals were found in the Upper Sacramento River.

- Summer diet largely consisted of King Salmon and carp (73% combined). Individuals were found in the Upper Sacramento River.
- Summer diet largely consisted of Mysid shrimp (80%). Individuals were found in the Delta.

**Overall.** The study did not differentiate diet by fish size for all locations and times of the year. Therefore, results where diet composition across size classes differentiated were summarized. Generally, adults in San Francisco Bay contained larger volumes of Shiner Perch and anchovies in stomachs, while juveniles in the Upper Sacramento River and Delta contained more King Salmon, carp, and Mysid shrimp.

## Young et al. 2022

Young, M.J., Feyrer, F., Smith, C.D., and D.A. Valentine. 2022. Habitat-specific foraging by Striped Bass (*Morone saxatilis*) in the San Francisco Estuary, California: implications for tidal restoration. San Francisco Estuary & Watershed Science 20 (3).

**Funding Source.** U.S. Bureau of Reclamation (Interagency Agreement).

**Study Period.** Spring (March 26-April 5) 2018 and Summer (July 9-18) 2018.

**Geographic Range.** Ryer Island in the north-central delta was targeted for this study. Three habitat types were sampled: marsh, shoal, and channel. These habitats were sampled both day and night using gill nets and trawls to minimize time of day and gear type bias.

**Predator assemblage evaluated.** Striped Bass were evaluated at a size range of 63 to 671 mm standard length, and an age range spanning 1-5 years.

**Prey species detected.** Stomach contents revealed 9,989 prey items representing 46 prey taxa.

### **Key Findings.**

- Tested for differences in fish size and stomach fullness across season and habitat types using ANOVA.

- Collected 269 Striped Bass of which 34 had empty stomachs (n = 235 individuals).
- Diets were dominated by invertebrates.
- Diets only differed by Striped Bass size in the spring.
- There were significant diet differences across habitats in both spring and summer. Striped Bass collected in marsh habitat had significantly different stomach contents than Striped Bass collected in channel or shoal habitat. The channel and shoal habitat stomach contents were not significantly different from each other.

**Overall.** The prey variability observed in this study, coupled with shifts in dominant prey types over time in the estuary, indicate that Striped Bass are an adaptable and opportunistic predator able to adjust to changing environmental conditions and prey availability. In this study, total invertebrate consumption was generally consistent across seasons, and variability was instead associated with specific invertebrate categories. Fish were only the most important diet item for large Striped Bass in the marsh in spring, and not any other habitat/season combination, consistent with Zeug et al. (2017). The dominant fish diet items were littoral or benthic fish species of least concern, with few pelagic or special status-fishes observed in diets.

## **Zeug et al. 2017**

Zeug, S.C., Feyrer, F.V., Brodsky, A., and J. Melgo. 2017. Piscivore diet response to a collapse in pelagic prey populations. *Environmental Biology of Fishes* 100: 947-958.

**Funding Source.** U.S. Bureau of Reclamation.

**Study Period.** November and December 2010 and 2011.

**Geographic Range.** Study was located at the San Francisco Estuary and centered on Suisun Bay and San Pablo Bay using multimesh gill nets.

**Predator assemblage evaluated.** Striped Bass, Sacramento Pikeminnow, Largemouth Bass.



**Prey species detected.** Generalized into 16 prey categories (see Table 1 in Zeug et al. 2017).

**Key Findings.**

- Across the study duration, 348 total stomachs were examined. Out of this total, 25% of stomachs had no identifiable contents.
- Striped Bass comprised the majority of piscivores collected (89%) followed by Sacramento Pikeminnow (10%). Two Largemouth Bass were collected (0.6% of total) but were excluded from comparisons among species due to the low sample size.
- Benthic prey accounted for 80% of all prey by weight and pelagic prey accounted for 7%. The remaining 13% consisted of other sources such as terrestrial or could not be identified (excessive digestion).
- Prey items in the stomachs of Striped Bass were gravimetrically dominated by *Crangon* spp. (26%), “other Osteichthyes” (17%), and Isopoda (16%; see Figure 4 in Zeug et al. 2017). No other prey item made up more than 10% of the diet by gravimetric proportion.
- In both years the category “other Osteichthyes” occurred in the greatest density near the confluence of the Sacramento and San Joaquin rivers.
- No special status species were detected in any piscivore stomach examined. However, small sample sizes, and time of year could have contributed to this.

**Overall.** The results indicate there has been a significant reduction in the contribution of pelagic prey resources to Striped Bass diets when compared to earlier studies (e.g., Johnson and Calhoun 1952; Thomas 1967) concomitant with the pelagic organism decline. Striped Bass responded to the pelagic organism decline by consuming greater proportions of benthic fish and invertebrates whereas Sacramento Pikeminnow diets were more specialized and consisted primarily of benthic fish in both years. If there has been a decline in SFE Striped Bass abundance, it could be linked to reduction in preferred prey resources.

### 3.3 Predation focused Striped Bass diet and foraging behavior studies

#### Michel et al. 2018

Michel, C.J., Smith, J.M., Demetras, N.J., Huff, D.D., and S.A. Hayes. 2018. Non-native fish predator density and molecular-based diet estimates suggest differing effects of predator species on juvenile salmon in the San Joaquin River, California. *San Francisco Estuary and Watershed Science* 16(4).

**Funding Source.** DWR.

**Study Period.** Sampling took place from early May 2014 through April 2015 using electrofishing boats. Sampling was scheduled to occur during historical peak out-migration of sub-yearling fall-run Chinook Salmon.

**Geographic Range.** Three sites near Old River in the Lower San Joaquin River.

**Predator assemblage evaluated.** Largemouth Bass (LMB), Channel Catfish (CHC), White Catfish (WHC), and Striped Bass (STB).

**Prey species detected.** The diet analysis focused on 12 selected prey species and is not considered a full comprehensive diet analysis. Largemouth bass, Striped Bass, Mississippi Silverside, Chinook, Sacramento Splittail, Threadfin Shad (TFS), Rainbow Trout/steelhead, Green Sturgeon, Delta Smelt, Longfin Smelt, Sacramento Pikeminnow, and White Sturgeon were all identified as prey through DNA assays.

**Key Findings.**

- Largemouth Bass (42%) and Striped Bass (40%) were by far the most captured predators in the study reaches, followed by White Catfish, Channel Catfish, and other Centrarchid species.
- The catch composition between these two habitats also varied; Largemouth Bass dominated the littoral habitat, and Striped Bass dominated the channel habitat. This could be a sampling (electrofishing) bias. Striped Bass were patchily distributed between sampling reaches.

- A total of 582 predator diets were collected, comprising 253 LMB diets, 186 STB diets, 107 WHC diets, and 36 CHC diets.
- CHC had the widest variety of prey species in their diets. The least frequent prey items found in CHC diets was STG, LFS, SPM, and STW.
- LMB was found in the highest proportion of diets for all species, followed by STB, MSS, CHK, and SPT, in approximately that order for all predators. DSM, RBT, and TFS were found in low frequencies in all four predator species.
- Contribution of salmonids to predator diets (2014 and 2015 combined): 27.7% of CHC diets tested positive for Chinook Salmon, followed by 4.8% of STB diets, 4.7% of WHC diets, and 2.8% of LMB diets. For Steelhead, 5.5% of CHC diets and 2.2% of STB diets had Steelhead; no WHC or LMB diets tested positive for Steelhead. Combined, salmonids were present in 33.3% of CHC diets, followed by 7.0% of STB diets, 4.7% of WHC diets, and 2.8% of LMB diets.
- Non-native predator (Largemouth Bass, Channel and White Catfish, and Striped Bass) diets were mostly comprised of other non-native predator species. Salmonid prey were found in only 7% of STB diets.

**Overall.** Michel et al. 2018 found that Striped Bass in these size-classes are mostly found in roving aggregations, and whether they are found in a study reach during the time of a survey is highly variable. This is consistent with the understanding that Striped Bass are highly mobile, migratory, and aggregating fish as sub-adults or small adults. This study also found that although all tested predator species ate salmonids, the predators tested positive more frequently for non-native piscivorous species. They also tested positive for many non-native prey species at higher frequencies. Other studies throughout the Delta have found similarly low frequencies of salmonids in predator diets, with typically less than 5% of Striped Bass diets containing salmonids, even during peak out-migration and in regions with higher densities of salmonids (Stevens 1966; Thomas 1967; Nobriga 2007). Only in the rare exception of when a migratory corridor becomes spatially constricted do salmonids become a major component of Striped Bass diets in the Delta (such as with fish ladders; Sabal et al. 2016).

## **Nobriga and Feyrer 2007**

Nobriga, M., and F. Feyrer. 2007. Shallow-water piscivore-prey dynamics in California's Sacramento–San Joaquin Delta. *San Francisco Estuary & Watershed Science* 5(2).

**Funding Source.** IEP.

**Study Period.** March–October 2001 and March–October 2003 using beach seines and gill nets for nearshore sampling.

**Geographic Range.** The study was located within the Sacramento–San Joaquin Delta. Central sampling locations were found on Liberty, Decker, and Sherman islands. Southern sites included Medford and Mildred islands.

**Predator assemblage evaluated.** Striped Bass, Largemouth Bass, and Sacramento Pikeminnow.

**Prey species detected.** See Table 1 in Nobriga and Freyrer (2007).

### **Key Findings.**

- Striped Bass had the broadest spatio-temporal distribution. Largemouth Bass had the narrowest spatio-temporal distribution.
- All three piscivores had diverse diet compositions comprised of numerous invertebrate and fish taxa.
- Field observations of changes in piscivore stomach contents through time have indicated that piscivorous fishes exhibit prey switching behavior. Striped Bass are opportunistic feeders that shift in prey items as the fish get larger/older (Stevens 1966).
- There were noticeable seasonal shifts in prey fish consumed by all three piscivores. Collectively, most native fish use occurred during spring (March–May) and the highest prey species richness occurred during summer (June–August).
- Largemouth Bass preyed on a greater number of native fish than the other two piscivores and consumed native fish farther into the season (July) than the other two piscivores (May).

- Striped Bass piscivory was significantly affected by season (chi-square = 24.6;  $P = 0.00002$ ), but not fork length (chi square = 7.37;  $P = 0.06$ ).
- Striped Bass typically only exceeded the 50% piscivory threshold during summer and fall regardless of size.

**Overall.** This study indicates that all three predators frequently occur in Delta shallow-water habitats. However, they acknowledge that having only five sampling sites limited the ability to generalize about piscivore distributions across the entire Delta. This study found that piscivore prey choices are functions of encounter and capture probabilities. Both encounter and capture probabilities are probably affected by prey relative abundance. Encounter probabilities also are influenced by environmental factors such as turbidity and vegetation density.

### **Peterson et al. 2020**

Peterson, M., J. Guignard, T. Pilger, and A. Fuller. 2020. Stanislaus Native Fish Plan: Field Summary Report for 2019 Activities. Technical Report to Oakdale Irrigation District and South San Joaquin Irrigation District. *Draft in Review*.

### **Peterson et al. 2023**

Peterson, M., T. Pilger, J. Guignard, A. Fuller, and D. Demko. Diets of Native and Non-native Piscivores in the Stanislaus River, California, Under Contrasting Hydrologic Conditions. *San Francisco Estuary & Watershed Science* 2: 1-22.

**Funding Source.** Oakdale and South San Joaquin Irrigation Districts.

**Study Period.** Spanned four months from March 1, 2019, through June 30, 2019.

**Geographic Range.** Lower Stanislaus River from Oakdale Recreation Area 66.9 river kilometer (rkm) to the confluence with the San Joaquin River.

**Predator assemblage evaluated.** While 17 predator species were targeted, black bass, striped bass, hardhead, Sacramento Pikeminnow, sunfish, and catfish were most evaluated.

**Prey species detected.** A variety of invertebrates fishes, and crustaceans.

### **Key Findings.**

- Predator composition included black bass (51%), Striped Bass (13%), sunfish (13%), Hardhead (12%), and Sacramento Pikeminnow (8%).
- Habitat types assessed in the study included rip-rap, submerged vegetation, overhanging vegetation, woody debris, open water, and unknown. Flows during the study period were between 3,000 and 4,000 cfs, and the dominant habitat types at these flows were submerged and overhanging vegetation.
- Black bass were ubiquitous throughout the study area and observed in all habitat types, but submerged vegetation was the most common. Striped Bass were concentrated in the middle and lower reaches and most often observed in overhanging and submerged vegetation, but also found in open water and woody debris.
- Invertebrates (insects, crustaceans, and annelids) dominated predator diets. Ninety percent of all identified prey items were invertebrates. Fish made up only seven percent of the total identified diet and were primarily consumed by black bass and Striped Bass.
- The two most observed consumed fish were Chinook Salmon and lamprey. Chinook salmon made up 8.5% of Striped Bass diet by number, and lamprey made up 6.7%.
  - Twenty four percent of Striped Bass caught were observed to have consumed at least one Chinook Salmon. Black bass were observed to consume Chinook Salmon at a lower rate of 9.2%.
  - Black bass that consumed salmon were 175-300 mm fork length (FL).
  - Striped Bass that consumed salmon were between 240-660 mm FL.
  - Striped Bass consumed Chinook Salmon and lamprey at a rate that increased gradually in March and April, peaked in May, and decreased slightly in June.
- Fork length (FL) of Striped Bass that consumed salmon significantly decreased over the study period, while FL of black bass that



consumed salmon increased slightly. However, mean FL of black bass did not change over sampling period, suggesting smaller black bass that ate salmon early in the season may not have been able to consume salmon later in the season with increases in prey size. Striped Bass appeared to consume salmon independent of prey size.

- Total estimated monthly consumption was highest for Striped Bass across the study period (March- June). Striped bass holds the highest estimated population-level impact on Chinook Salmon based on rotary screw trap estimates of salmon migration into the study reach.
- The total number of juvenile Chinook Salmon entering the study area occurred at the same time of diet collections. Mismatch in temporal scales would most likely overestimate the predation impact on Chinook Salmon.

**Overall.** Overall fish consumption was low (7% of total predator diets), and most often observed in black bass and Striped Bass. Fish species consumed by Striped Bass primarily consisted of Chinook Salmon (8.5%) and lamprey (6.7%), but also included non-natives such as bluegill (0.6%), carp (3%), green sunfish (0.6%), loach (0.6%), and Striped Bass (0.6%). Chinook Salmon occurrence was observed in Striped Bass 240-660 mm FL (9-25 inches). Consumption of Chinook Salmon appeared to be dependent on prey size for black bass, but independent for Striped Bass. Striped Bass were estimated to have the largest impact on salmon populations in the study area compared to other predators. Consumption estimates rely on assumptions that may or may not have been violated.

## **Stompe et al. 2020**

Stompe, D.K., Roberts, J.D., Estrada, C.A., Keller, D.M., Balfour, N.M., and A.I. Banet. 2020. Sacramento River predator diet analysis: a comparative study. San Francisco Estuary & Watershed Science 18(1).

**Funding Source.** Northern California Water Association and CDFW.

**Study Period.** Hook and line sampling occurred between March 2017-November 2017. Sampling occurred over three habitat types. riprap, natural, and manmade.

**Geographic Range.** Sacramento River (middle) near Chico, and Ord Bend in the Glenn-Colusa Irrigation District.

**Predator assemblage evaluated.** Striped Bass between 22.5 cm and 47 cm and Sacramento Pikeminnow were evaluated. The study analyzed predator size, distribution, and diet. Predator Catch Per Unit Effort (CPUE) was used as a measure of abundance.

**Prey species detected.** Prey species were determined through visual ID and PCR primers. Major prey categories included macroinvertebrates, crayfish, and fishes (see table for index of relative importance IRI%).

**Key Findings.**

- Out of the 155 target species that were captured, 68 were Sacramento Pikeminnow and 87 were Striped Bass. Of these individuals, Sacramento Pikeminnow (n=30) and Striped Bass (n=47) contained stomach contents that were identifiable.
- Sampled Striped Bass and Sacramento Pikeminnow were evenly distributed across all habitat types.
- Temporal distribution showed that Striped Bass CPUE was higher in summer than in fall.
- Of the individuals that contained stomach contents, piscivory was observed in 71% of Sacramento Pikeminnow and 84% of Striped Bass.
- The two most important prey items for both predator species, as enumerated by %IRI, were macroinvertebrates (excluding crayfish) and Chinook Salmon (Sacramento Pikeminnow: 77% and 15%, respectively; Striped Bass: 78% and 17%, respectively; Table 3.1 below).
- %IRI and PERMANOVA modeling indicate no difference in diets between Sacramento Pikeminnow and Striped Bass.
- Prey frequency of occurrence showed no relationship with species or habitat type but was significantly influenced by water temperature.

**Table 3.1.** In Stompe et al. 2020 (Table 3). Table represents %IRI values for Sacramento Pikeminnow and Striped Bass captured via hook and line sampling near Chico, Ca.

| <b>Prey Species</b>    | <b>Sacramento<br/>Pikeminnow</b> | <b>Striped Bass</b> |
|------------------------|----------------------------------|---------------------|
| American Shad          | 0.08                             | 0.64                |
| Chinook                | 14.57                            | 17.03               |
| Crayfish               | 2.56                             | 0.17                |
| Green Sturgeon         | 0.00                             | 0.08                |
| Hardhead               | 0.48                             | 2.75                |
| Macroinvertebrate spp. | 76.90                            | 78.09               |
| Pacific Lamprey        | 0.90                             | 0.11                |
| Sculpin spp.           | 4.51                             | 1.03                |
| Tule Perch             | 0.00                             | 0.10                |

**Overall.** %IRI and PERMANOVA modeling indicated no difference in diets between Sacramento Pikeminnow and Striped Bass. While there are obvious life-history differences between these two species, on a per capita basis, neither appears to have a higher impact on observed prey, including Chinook Salmon, than the other. Both Sacramento Pikeminnow and Striped Bass are opportunistically feeding on seasonally available prey populations. Results support the notion that Sacramento Pikeminnow and Striped Bass exhibit prey-switching behavior, both spatially and temporally. This likely occurs in the presence of high densities of certain prey, such as during in-river releases of hatchery Chinook Salmon. The observed proportion of Chinook Salmon in predator diets within the Sacramento River was lower than was seen by Thomas (1967). Overall predator diets in the Sacramento River were substantially different than those observed within the Delta (Stevens 1966; Nobriga and Feyrer 2007). This could indicate that predation pressure or likelihood of being predated upon is different during the river migratory phase versus in the more open-water habitat of the delta. PERMANOVA modeling showed that water temperature was the only variable measured that significantly affected

predator diets. Because of the association between water temperature and seasonality, this may indicate a temporal association of predator diets, which would support the conclusion that both Sacramento Pikeminnow and Striped Bass are opportunistically feeding on seasonally available prey populations.

### 3.4 Size specific Striped Bass diet and foraging behavior

#### Heubach et al. 1963

Heubach, W., Toth, R.J., and A.M., McCready. 1963. Food of young-of-the-year Striped Bass (*Roccus saxatilis*) in the Sacramento-San Joaquin River System. California Fish and Game 49 (4): 224-239.

**Funding Source.** Dingell-Johnson Project California F-9-R, and Federal Aid to Fish Restoration.

**Study Period.** Opportunistically collected in conjunction with other field activities from June-November 1956-1961.

**Geographic Range.** Lower Sacramento-San Joaquin River system (tow net and seining stations).

**Predator assemblage evaluated.** Juvenile Striped Bass (YOY).

**Prey species detected.** Planktonic species.

#### **Key Findings.**

- This study took place prior to the California Water Plan establishing baseline diets for YOY Striped Bass in the delta.
- The percentage frequency of copepod occurrence was greater in small bass than large ones. Larger plankton, *Neomysis* and *Corophium*, occurred more frequently in larger YOY Striped Bass.
- Salinity affected prey distribution/availability and therefore diets. The occurrence of plankton species in YOY stomachs generally coincided with the distribution of plankton in the environment.

- In this study, several major groups comprising over 20 species of small animals were eaten by young-of-the-year Striped Bass. Many of these organisms were also reported in previous food habits studies (cited within Heubach et al. 1963).
- Fish were unimportant in the diet of YOY Striped Bass.

**Overall.** Fish were unimportant in the diet of young-of-the-year Striped Bass. The occurrence of organisms in the stomachs generally agreed with the distribution of plankton organisms in the environment. Thus, food habits in any area were largely controlled by the factors controlling plankton distribution. Salinity and water flow were the most important of these factors.

### **Walter and Austin 2003**

Walter, J.F., and H.M. Austin. 2003. Diet composition of large Striped Bass (*Morone saxatilis*) in Chesapeake Bay. Fishery Bulletin 101: 414-423.

**Study Period.** March 1997 through May 1998.

**Geographic Range.** Chesapeake Bay, tributaries, and Chesapeake Bay mouth.

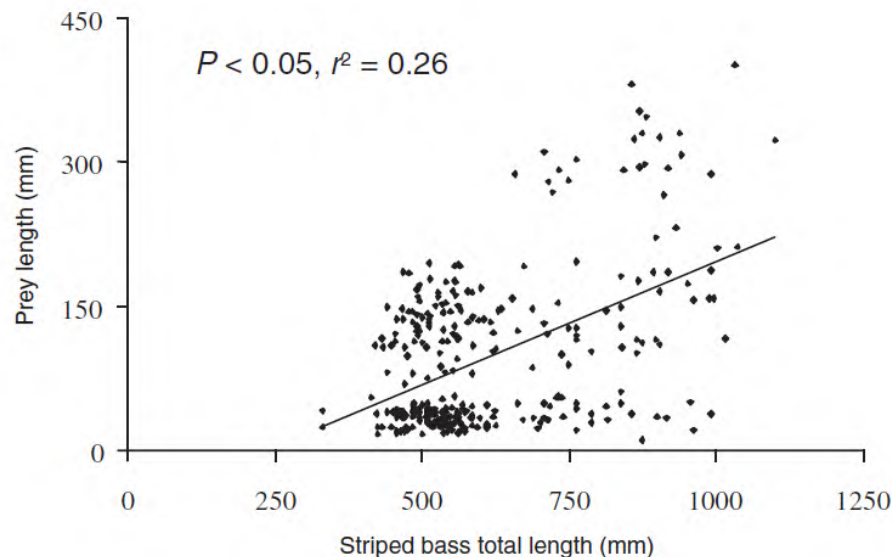
**Predator assemblage evaluated.** Striped Bass.

**Prey species detected.** Through diet analysis, 34 different species of fish and 18 species of invertebrates were detected (see Table 2 in Walter and Austin 2003).

#### **Key Findings.**

- Two size classes of Striped Bass were analyzed. Striped Bass between 458-710 mm were classified as resident and migratory fish. Striped Bass between 711-1255 mm were classified as a coastal migrant fish.
- Out of the 1225 fish analyzed, 56% contained items in stomach (these results are similar to Brandl et al. 2021)
- Clupeid fishes dominated the diet, particularly Atlantic Menhaden. Menhaden accounted for 44% of the weight and occurred in 18% of all stomachs.

- Menhaden ranged in length from 103 to 360 mm total length, and scored higher on the index of relative important compared to any other species as calculated in the equation below.
  - $IRI = (\%N + \%W) \times \%FO$
  - Where %N = the percentage of a prey species by number, %W = the percentage of a prey species by weight, and %FO = the percent frequency of occurrence of a prey species.
- Size appeared to indicate potential differences in Striped Bass diets. Smaller Striped Bass consumed Bay Anchovy, juvenile Spotted Hake, whereas larger Striped Bass consumed anadromous herrings.
- There was a significant relationship between Striped Bass total length and prey length ( $P < 0.05$ ,  $r^2 = 0.26$ ), indicating that larger and older Striped Bass ate larger prey. The regression fit was poor, indicating that large fish also consumed small prey (Figure 3.1). In other words, larger Striped Bass consumed a greater size range of prey than smaller Striped Bass.

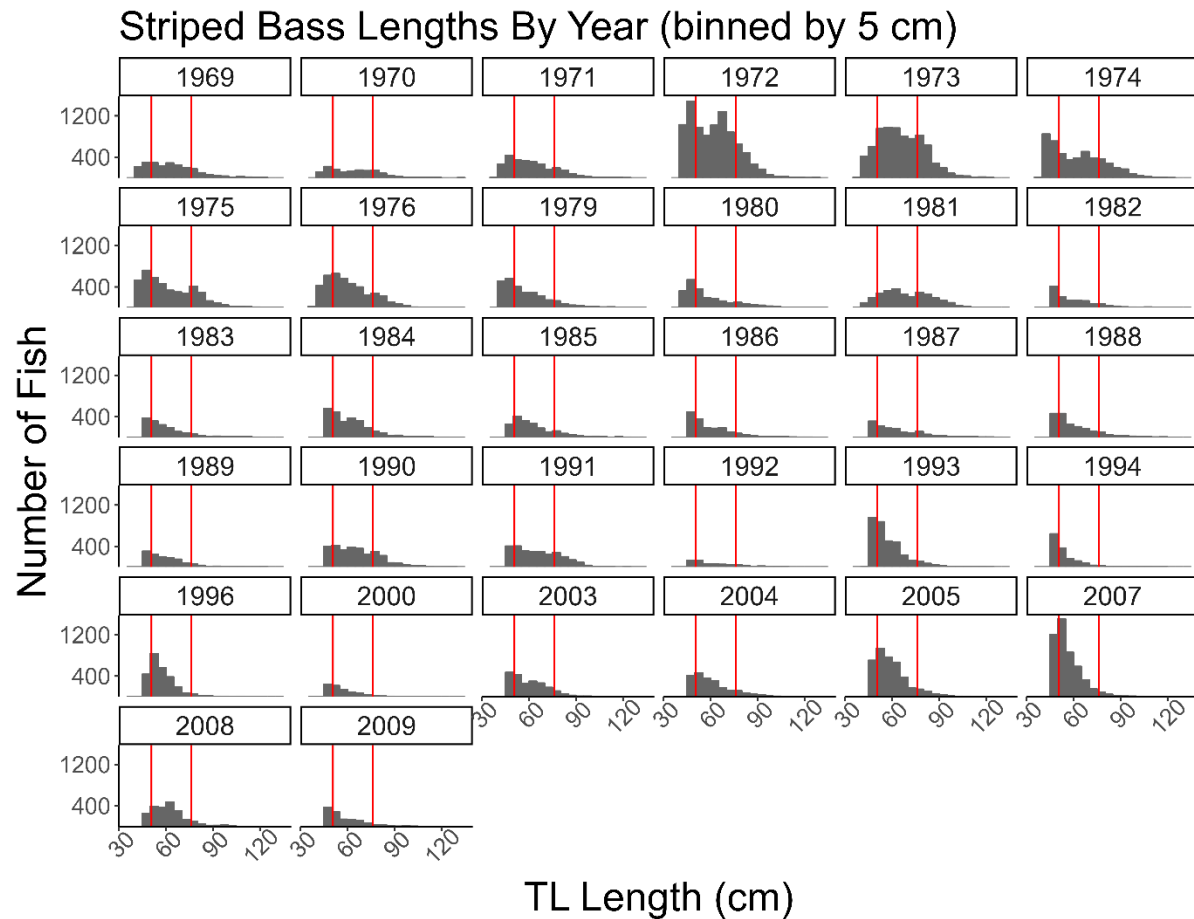


**Figure 3.1.** In Walter and Austin 2003 (Figure 4). Plot of prey total length against total length for Striped Bass.



- Smaller Striped Bass consumed prey that approached 40% of their total length. However, most prey consumed by all sizes of Striped Bass were smaller, young-of-the-year fishes. This is corroborated by Overton 2002 who predicted an optimal prey size to be 21% of the Striped Bass length.
- Spring feeding on anadromous fishes like Gizzard Shad, anadromous herring, and White Perch indicated a seasonal trend which corresponded to spawning migrations of Striped Bass.

**Overall.** Smaller Striped Bass (18-28 inches) consumed up to 40% body length, but mostly ate smaller, YOY fishes (corroborated by Overton 2002), whereas larger Striped Bass (> 28 inches) consumed both small and large prey. This study further supports the idea that Striped Bass interact with out-migrating anadromous fishes during their spawning migrations, and so the temporal overlap of these interactions are important when thinking about out-migrating salmonids in CA. Fyke data show that most Striped Bass entering the Sac River in the spring are in this < 28 inch range (see Figure 3.2 below), and therefore may exhibit feeding patterns of the 'smaller' Striped Bass in this study. Goertler et al. 2021 suggests that climate change, particularly warming ocean temperatures and decreased precipitation could increase migration timing of Striped Bass, thus potentially resulting in more temporal overlap with out-migrating juvenile salmonids.



Fyke Net Tagging Program

**Figure 3.2.** Length-frequency histograms for Striped Bass sampled from fyke nets. Parallel vertical red lines indicate the proposed 20-30 inch slot limit. Data Source: Striped Bass Tagging Program.

### 3.5 Striped Bass migration timing in relation to environmental conditions

#### Calhoun 1952

Calhoun, A.J., 1952. Annual migration of California Striped Bass. California Fish and Game 38(3): 391–403.

**Funding Source.** Unknown, CDFG funded most likely.

**Study Period.** Tagging took place January and November 1947, Spring 1950 and 1951. Tag recoveries took place November through April soon after tagging.

**Geographic Range.** Sacramento-San Joaquin Delta.

**Predator assemblage evaluated.** Adult Striped Bass (>20 ") caught in gill nets (n = 4,136) and marked with Disc tags.

**Prey species detected.** NA.

#### **Key Findings.**

- Seasonal movement of adult Striped Bass.
  - During winter-early spring, Striped Bass were recaptured close to tagging locations. (Antioch and Franks Tract) within the Delta, no signs of large migrations.
  - During spring (April), Striped Bass spread out throughout the delta and up into rivers to spawn.
  - During late spring-early summer, Striped Bass are post spawn. Striped Bass are still spread widely across the delta but in greater concentrations in the delta central indicating that they are moving back into the delta.
  - During summer, Striped Bass recaptures indicate that they are moving toward salt water. Recaptures are further downstream in San Pablo Bay.

- During fall, Striped Bass recaptures are once again higher up in the delta near tagging locations but widespread (not in tributaries though), mostly sloughs in the delta.
- During winter, Striped Bass showed the same pattern as previous year. Clumping near tagging locations, more concentrated than in the fall.

**Overall.** The results of tagging studies conducted in 1947, 1950, and 1951 indicate that in the summer months, adult bass are distributed mainly in San Francisco Bay and the ocean. In the fall and winter most of them move upstream to San Pablo Bay, Suisun Bay, and the Delta. In the spring the spawning population moves farther upstream where they spawn, mostly during May and June, in fresh water of 15°C or higher. After spawning, most large fish return to the lower bays and the ocean.

## Goertler et al. 2021

Goertler, P., Mahardja, B., and T. Sommer. 2021. Striped Bass (*Morone saxatilis*) migration timing driven by estuary outflow and sea surface temperature in the San Francisco Bay-Delta, California. Scientific Reports 11: 1510. DOI 10.1038/s41598-020-80517-5.

**Funding Source.** Interagency Ecological Program and CDWR.

**Study Period.** 1969-present.

**Geographic Range.** San Francisco Estuary, Sacramento-San Joaquin Delta, and tributaries.

**Predator assemblage evaluated.** NA.

**Prey species detected.** NA.

### **Key Findings.**

- Median migration timing varied from the third week of May to the fourth week of June.
- Striped Bass migrated later in years when Delta outflow was greater and sea surface temperature was cooler.
- Results suggest increased sea surface temperature congruent with decreased precipitation could shift Striped Bass migration earlier in spring.
- Findings are consistent with Striped Bass movement in their native range in the Chesapeake Bay, where warmer spring water temperature is linked with earlier spawning migration.
- Early migration has implications for predation risk on seaward migrating juvenile Chinook Salmon. There may be more temporal overlap if Striped Bass migrate earlier, as most juvenile salmon exited rivers by late June.
- Estuary outflow was positively related to median date, indicating that Striped Bass migration was delayed when estuary outflow was high.

- Results may indicate increased residence time in the estuary in response to food web and habitat benefits.

**Overall.** Warming temps and decreased precipitation could increase migration timing of Striped Bass, which has the potential to create more temporal overlap with out-migrating Chinook Salmon.

## Le Doux-Bloom 2012

Le Doux-Bloom, C. M. 2012. Distribution, habitat use, and movement patterns of sub-adult Striped Bass *Morone saxatilis* in the San Francisco Estuary Watershed, California. University of California, Davis ProQuest Dissertations Publishing.

**Funding Source.** DWR and IEP.

**Study Period.** Summer 2010- summer 2011.

**Geographic Range.** Regions include Central Bay, South Bay, San Pablo Bay, Carquinez Strait, San Joaquin River, Central Delta, East Delta, South Delta, Sacramento River, Cache Complex, American River, and Feather River.

**Predator assemblage evaluated.** Striped Bass (n = 99) with a length range of 9-17 inches.

**Prey species detected.** NA.

### Key Findings.

- Chapter 2: Distribution and Habitat Use of Sub-adult Striped Bass (*Morone saxatilis*) in the San Francisco Estuary Watershed
  - During fall, Striped Bass occupied Central Bay, Cache Complex, Central Delta, Sacramento River, and Carquinez Strait. Over winter, fish shifted toward the ocean, generally staying around Carquinez Strait, Central Bay, and the lower Sacramento River. Some study fish may have emigrated to the ocean, evidenced by low detections in the bays and delta. Striped Bass dispersed in the spring, expanding from nearshore Pacific Ocean and 65 river kilometers (rkm) to Coyote Creek in the South Bay, near San Jose to the upper Sacramento River near Colusa and 264 rkm upstream on the

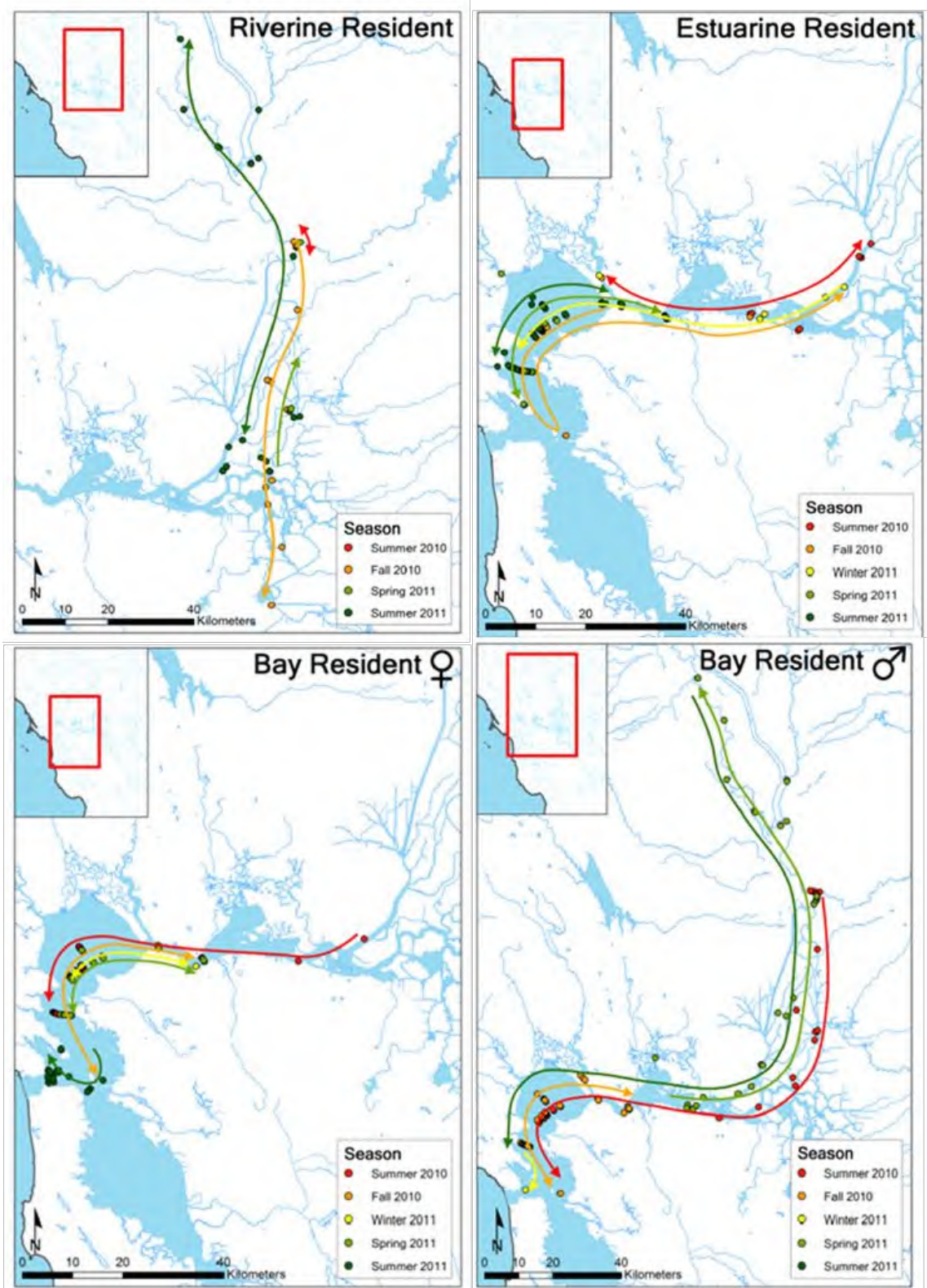


Feather River. This could be related to increased temperatures in the San Francisco Estuary Watershed, and timing of upstream migration may be temperature-dependent, as this occurred when temps went from cold to cool.

- In 2010, an average flow year, most fish were observed between Carquinez Strait and Sacramento River (rkm 192). During a high flow year (2011) more fish aggregated toward the ocean.
  - Temperature appeared to influence habitat use in winter and spring. Fish shifted to higher salinity habitat when temperature decreased, and only revisited upstream locations when temperature increased above 10°C.
  - Results indicate Striped Bass inhabited shoal habitat across all seasons, with channel and shoal habitat used equally over winter.
- *Chapter 3: Movement Patterns of Sub-adult Striped Bass in the San Francisco Estuary Watershed:*
    - There were N = 43 individual fish detected.
    - The study found three movement patterns for Striped Bass: River residents, estuarine residents (freshwater to mesohaline habitats) and bay residents (predominantly polyhaline to euhaline habitats).
    - Summer movement patterns were segregated by salinity, while movements increased in all resident groups during late fall and spring. Riverine fish moved from higher in the watershed to lower freshwater habitats which may reflect a preference for warmer water to over-winter in. While receivers recorded movement into the south delta, their actual whereabouts over the winter could not be detected due to comparatively fewer receivers there. As temperatures increased in late spring, riverine fish returned to upstream habitats.

- The water temperature of both river and ocean may trigger sub-adult movement by bay and riverine groups.
- There was some evidence of spawning migration, where individuals moved upstream in the spring, and returned a few weeks later to higher salinity habitat.

**Overall.** There were three distinct movement patterns detected from tagged Striped Bass that appeared to be related to salinity. There is also a strong correlation between temperature preference and salinity. Fish shifted to higher salinity habitat when temperatures decreased, and revisited upstream locations when temperatures increased above 10°C. Striped Bass in this study tended to utilize both channel and shoal habitat ubiquitously throughout the seasons (Figure 3.3).



**Figure 3.3.** *In Le Doux-Bloom 2012.* Figures depict seasonal movement patterns of male and female Striped Bass in the summer of 2010 and 2011.

### 3.6 Habitat alteration and predation

#### Michel et al. 2020

Michel, C.J., M.J. Henderson, C.M. Loomis, J.M. Smith, N.J. Demetras, I.S. Iglesias, B.M. Lehman, and D.D. Huff. 2020. Fish predation on a landscape scale. *Ecosphere* 11(6): e03168. DOI 10.1002/ecs2.3168.

**Funding Source.** CDFW Research Regarding Predation on Threatened and/or Endangered Species in the Delta, Sacramento and San Joaquin Watersheds Proposal Solicitation Package

**Study Period.** April 3- May 13, 2017.

**Geographic Range.** A Generalized Random Tessellation Stratified algorithm was used to select twenty sites in the South Delta and San Joaquin Basin.

**Predator assemblage evaluated.** This study did not target anything specific, and no predator species was identified.

**Prey species detected.** Predation Event Recorders (PERS) were employed using tethered, drifting hatchery Chinook Salmon.

#### **Key Findings.**

- Percent of preyed-upon PERs varied through time and between sites, ranging from 0% to 37%. In total, they deployed 1,670 PERs during the spring of 2017, of which 15.7% (~262) were preyed upon.
- Predation risk for salmonids and other similar prey species in the South Delta were strongly influenced by water temperature, time of day, predator density, and bottom roughness.
- The upper limit of temperatures measured during sampling in the spring of 2017 (20°C) is approximately the lower end of the thermal preference of Striped Bass. Predation rates may have changed under other different thermal conditions that favored Striped Bass presence in the study area.

- This study found a strong influence of predator densities on predation risk, indicating that predation risk is not solely mediated through habitat and environmental conditions.

**Overall.** This study identified areas of predation hotspots and environmental covariates associated with increased predation. However, they used tethered prey so results likely represent higher predation rates, don't represent how prey can evade predators, or how prey naturally interact with their environments. Juvenile salmonid distribution, health, and overall vulnerability to predation were not considered.

### **Sabal et al. 2016**

Sabal, M., Hayes, S., Merz, J., and J. Setka. 2016. Habitat alterations and nonnative predator, Striped Bass, increase native Chinook Salmon mortality in the Central Valley, California. *North American Journal of Fisheries Management* 36: 309-320.

**Funding Source.** NOAA/ NMFS.

**Study Period.** April 23-May 24, 2013. Each site (n=30) was sampled 3 times.

**Geographic Range.** Mokelumne River at Woodbridge Irrigation District Dam (WIID).

**Predator assemblage evaluated.** Striped Bass.

**Prey species detected.** Chinook Salmon smolts (hatchery).

#### **Key Findings.**

- Combined Striped Bass relative abundance surveys with diet analysis to compare rates of salmon predation across different habitat types.
- A total of 10 sites were sampled using electrofishing. Each site was assigned to one of 3 habitat types (WIDD, other altered, and natural).
- A before-after control impact design using predator removal was paired with Chinook Salmon releases (n= 2,000 total Chinook Salmon, over 2 release groups).

- The Striped Bass removal–salmon survival experiment showed a 10.2% increase in survival of juvenile Chinook Salmon after 11 Striped Bass were removed.
- Diet energetic analysis demonstrated that 7.9–13.1% of the emigrating juvenile Chinook Salmon were consumed.
- A local predation hot spot (WIDD) was associated with increased per capita consumption (PCC) of juvenile Chinook Salmon by Striped Bass and attracted larger numbers of Striped Bass, thus decreasing the survival of emigrating juvenile salmon by 8–29%
- According to this study, a single Striped Bass could consume between 0.71–1.20% of the released juvenile Chinook Salmon population (n=2000).

**Overall.** Striped Bass aggregated at WIDD, exhibiting an eightfold increase in CPUE compared with that at other altered locations and a 60-fold increase in CPUE compared with that at natural locations. Diets of Striped Bass collected at WIDD consisted primarily of juvenile Chinook Salmon, and the per capita impact of Striped Bass on juvenile salmon was higher at WIDD than at other altered locations. However, 2,000 Chinook Salmon smolts were released for this study so diets should primarily consist of the most abundant prey item, especially when passing through a pinch point such as the WIDD. This study indicated that Striped Bass could have a major population level impact on released hatchery Chinook Salmon smolts but extrapolation to wild smolts is challenging.

### 3.7 Predation impacts on listed species

#### Boughton and Ohms 2020

Boughton, D.A., and H.A. Ohms. 2020. Carmel River Steelhead Fishery Report - 2018. 56 p. Santa Cruz (CA): Prepared by National Marine Fisheries Service for the California-American Water Company in fulfillment of the Memorandum of Agreement SWC-156.

**Funding Source.** California-American Water Company.



**Study Period.** Juvenile and adult Striped Bass diet sampling occurred from June to January in 2010 and 2011 and was conducted by CDFW. Carmel River Steelhead Association (CRSA) used eDNA methods in June and July of 2017 to identify contents of Striped Bass diet.

**Geographic range.** Carmel River.

**Predator assemblage evaluated.** 525 Striped Bass (SB) diets analyzed over the two year period (2010-2011). Twenty two SB diets (sizes ranging from 16-31 inches) were analyzed using eDNA in 2017.

**Prey species detected.** Crustaceans and fishes.

**Key Findings.**

- In both years, the majority of SB stomachs were empty (61% and 74%, 2010 and 2011, respectively). Unknown as to whether this reflects quick digestion of prey items or the inability of SB to find and consume prey items.
- Of the contents that could be identified, prey items included Crustaceans (mysids, amphipods, and isopods) and fish (steelhead/ Rainbow Trout, sculpin, Three-spine Stickleback, lamprey, and goby). Crustaceans and fishes were found in roughly equal numbers.
- eDNA analysis from 22 SB diets indicated that 59% (n=13) contained steelhead DNA, and 27% (n= 6) contained other fish contents in their stomachs or upper intestines.

**Overall.** The results of this study indicate that SB consumed all known fish species in the Carmel River; however, fish species consumption was found in roughly equal proportions as crustaceans. The potential effects of SB on steelhead in Carmel River is still unknown, there isn't data available to determine whether SB predation is contributing to the decline of steelhead in this location. Future approaches to address this question included: stable isotope analysis of SB muscle tissue, bioenergetics modeling, environmental data collection, and life-cycle modeling.

## Brandl et al. 2021

Brandl, S., Schreier, B., Conrad, L.J., May, B., and M. Baerwald. 2021. Enumerating predation on Chinook Salmon, Delta Smelt, and other San Francisco estuary fishes using genomics. *North American Journal of Fisheries Management* 41: 1053-1065.

**Funding Source.** CDFW's Ecological Restoration Program.

**Study Period.** The months of December, April, and June from Dec 2012-June 2014 were chosen to encompass critical periods of native fish migration. However, analysis was confined to April 2014 to avoid confounding factors associated with seasonal effects, extreme catch variability among our sampling months, and other factors. Catch of Striped Bass was variable, and 63% of all Striped Bass catch occurred in April 2014. The native prey abundance was statically correlated with samples from April 2014.

**Geographic range.** Northern Delta:

- Steamboat slough (Chinook Salmon outmigration corridor).
- Miner/Sutter slough (Chinook Salmon outmigration corridor).
- Sacramento River (Chinook Salmon outmigration corridor).
- Liberty Island (rearing area for Delta Smelt and other native species).
- Sac Deep Water Shipping Channel (rearing area for Delta Smelt and other native species).

**Predator assemblage evaluated.** Striped Bass was the primary target. The following predators were also sampled opportunistically; Largemouth Bass, Smallmouth Bass, White Catfish, Channel Catfish, and Sacramento Pikeminnow.

**Prey species detected.** 13 prey taxa.

- **Non-native.** Striped Bass (17%) and Mississippi Silverside (9%)-most frequently detected in all predators.
- **Native.** Sacramento Pikeminnow (16%) and Chinook Salmon (13%) Delta Smelt (4%) and Longfin Smelt (6%). White Sturgeon,

Green Sturgeon, and steelhead were all ~ 0% (only 0-3 total detections for each species). Results focus on Striped Bass predation of Chinook Salmon, as very few Delta Smelt were detected in gut analysis.

### **Key Findings.**

- Results of this study reflected the proportions of prey items detected in fish that had contents in their stomachs. Proportions of empty stomachs varied (Channel catfish 65%, Largemouth Bass 81%, Sacramento Pikeminnow 47%, Smallmouth Bass 74%, Striped Bass 74%, White Catfish 50%).
- A wide range of prey taxa were detected in Striped Bass, indicating that they are not highly selective in prey choice.
- For Striped Bass with prey in gut, 60% of detections were native species (Sacramento Pikeminnow ( $n = 32$ ), Chinook Salmon ( $n = 29$ ), and Splittail ( $n = 18$ )). This corresponds to native species in 15% of Striped Bass sampled.
- Detection of Striped Bass predation on Chinook Salmon was higher in habitats with relatively higher temperature and lower conductivity (Brandl et al. 2021, Table 5).
- Predatory fish made up a relatively high proportion of diets of other predatory fish. Striped Bass consumed other predatory fish at similar rates as more traditional prey items like Chinook or Threadfin Shad
- Longfin Smelt were detected in gut contents of 20% of Sacramento Pikeminnows ( $n = 13$ ). Approximately 1% of Striped Bass contained Delta Smelt. Because of the low detections of Delta Smelt, this species wasn't included in further analyses.
- Chinook Salmon were detected in 27% of Smallmouth Bass guts, and 18% of Striped Bass guts. Chinook Salmon were not found in Largemouth bass, White Catfish, Channel Catfish, or Sacramento Pikeminnow guts.

**Overall.** This study found high prevalence of empty guts in Striped Bass (74%), but those that contained prey had a significant level of native species detected (60%). Predatory species were also frequently detected

in Striped Bass, noting that Chinook Salmon presence occurred in similar quantities as other predatory species. Striped Bass predation on Chinook was correlated with higher temps and lower conductivity.

### **Grossman et al. 2013**

Grossman, G., Essington, T., Johnson, B., Miller, J., Monsen, N., and T. Pearsons. 2013. Effects of fish predation on salmonids in the Sacramento River–San Joaquin Delta and associated ecosystems. Panel final report. 71 p. Sacramento (CA): California Department Fish Wildlife, Delta Stewardship Council, and National Marine Fisheries Service.

**Funding Source.** CDFW, Delta Stewardship Council, and NMFS workshop proceedings.

**Study Period.** Panel review of predation literature and presentations from the 2013 Fish Predation Workshop.

**Geographic Range.** Sacramento-San Joaquin Delta.

**Predator assemblage evaluated.** Varied by study evaluated.

**Prey species detected.** Salmonids.

#### **Key Findings.**

- In the case of juvenile salmonid prey in the Delta, predators may display positive selectivity for these species because they are energy-rich, are easily handled (i.e., soft-rayed, and fusiform) and potentially naive to invasive predators.
- Fish predation on salmonids in the Delta is specific to the smolt life stage. This and the context dependency of these predator-prey relationships, given the variable Delta environment, undoubtedly will make the population-level effects of fish predation on salmonid survivorship/adult returns challenging to detect.
- Population data show conflicting results, and some studies show adult Striped Bass (age-3+) declining in abundance whereas other studies show a long-term decline in age-0 fish, but a relatively stable adult population (see section 2A in document, pg. 21).

- The causal factors driving divergent trends in age-0 and adult Striped Bass abundance are unclear. In part, they may be due to a shift towards shallower habitats by age-0 fish, thereby reducing catches in the midwater trawl survey which has used permanent sampling stations.

**Overall.** There is little information on the spatial distribution and size/age structures of fish predator populations, or how these characteristics vary over time. This greatly limited the Panel's ability to make quantitative inferences regarding the effects of fish predation on salmonids at the population level. Populations of some fish predators (e.g., Striped Bass) have declined over time, but this decline has not coincided with concomitant increases in salmonid populations and there is uncertainty regarding variation in the abundance of sub-adult Striped Bass (Loboschewsky et al. 2012). Juvenile salmon are clearly consumed by fish predators and several studies indicate that the population of predators is large enough to effectively consume all juvenile salmon production. However, given extensive flow modification, altered habitat conditions, native and non-native fish and avian predators, temperature and dissolved oxygen limitations, and overall reduction in historical salmon population size, it is not clear what proportion of juvenile mortality can be directly attributed to fish predation.

## **Grossman 2016**

Grossman, G.D. 2016. Predation on fishes in the Sacramento-San Joaquin Delta: current knowledge and future directions. *San Francisco Estuary & Watershed Science* 14(2).

**Funding Source.** Delta Stewardship Council.

**Study Period.** This is a Review Study using gray literature, presentations from the 2013 Fish Predation Workshop, and 2015 IEP Workshop.

**Geographic Range.** Sacramento-San Joaquin Delta.

**Predator assemblage evaluated.** Literature was searched and researchers actively working on dietary or predator-prey studies on Delta fishes were contacted. Out of the resulting data, a matrix of predator species and their piscine prey was compiled.

**Prey species detected.** Prey varied by study reviewed.

**Key Findings.**

- Many factors induced variation into predator–prey relationships including: (1) the presence and type of shelter (e.g., submerged aquatic vegetation (SAV) or woody debris), (2) the ratio of prey size to predator size, (3) seasonal changes in abundance of the prey array, (4) defensive morphological (e.g., spines) or behavioral adaptations, and (5) seasonal changes in habitat quality for prey, such as those produced by influxes of contaminants during winter–spring high flows or high water temperatures during summer and fall.
- The act of predation may be broken into several component rates, including search and encounter, pursuit and attack, capture and handling, and consumption. These components are affected by a variety of changes that have occurred in the Delta. In unmodified environments, these components are affected by factors such as prey abundance and availability, spatial and temporal overlap of predator and prey, habitat complexity, turbidity, behavior, physiology, and morphological adaptations that facilitate (predator) or inhibit (prey) the predation process.
- The effects of both contaminants and invasive species may be magnified by environmental changes that have occurred in the Delta over the last 100 years. Those changes include: (1) species invasions that alter physical habitat structure, (2) alterations of hydrologic regimes, temperature regimes and turbidity levels, (3) wetland loss, and (4) anthropogenic changes in physical structure (levees, canals, and abstraction facilities). Additionally, those factors are coupled with changes in climate, as well as (6) eco-system effects of invasives (e.g. shifts in food webs, changes in structural complexity of littoral habitats by invasive plants, etc.).
- The data indicated that most predators were only occasional consumers of individual prey species. See Table 2 in Grossman 2016 for ranked predator-prey interactions by species.
- Moderate consumption was observed in Sacramento Pikeminnow consuming Longfin Smelt, Striped Bass consuming Sacramento Splittail, and Largemouth Bass consuming Prickly Sculpin.



- Common consumption was observed in Striped Bass consuming Chinook Salmon, Largemouth Bass consuming Sacramento Pikeminnow, and Channel Catfish consuming Largemouth Bass.

**Overall.** Some invasive predators have been established in the Delta for over 100 years (e.g., Striped Bass) and it is possible that prey species have had sufficient time to develop behavioral adaptations to these predators. This analysis yielded few generalizations regarding predator–prey interactions for Delta fishes other than the observation that most predators were unspecialized and consumed a wide variety of both native and invasive fishes. Most predators fed primarily on invasive species. Given the generalist nature of vertebrate predators, this likely represents consumption of prey in proportion to their abundance.

### **Lindley and Mohr 2003**

Lindley, S.T., and M.S. Mohr. 2003. Modeling the effect of Striped Bass (*Morone saxatilis*) on the population viability of Sacramento River winter-run Chinook Salmon (*Oncorhynchus tshawytscha*). Fishery Bulletin 101(2): 321-331.

**Funding Source.** National Center for Ecological Analysis and Synthesis which is funded by an NSF grant, UC Santa Barbara, and the State of California.

**Study Period.** NA.

**Geographic Range.** NA.

**Predator assemblage evaluated.** Striped Bass through adult mark-recapture data between 1968-1995 (Kohlhorst 1999).

**Prey species detected.** Winter-run Chinook Salmon adult spawning estimates from Red Bluff Diversion Dam (RBDD) 1967-1996 (Myers et al. 1998).

### **Key Findings.**

- The current Striped Bass population of roughly  $1 \times 10^6$  adults consume about 9% of winter-run Chinook Salmon outmigrants. By comparison, based on prey consumption rates and predator and prey abundances, Jager et al. (1997), using a spatially explicit individual

based model, estimated that between 13% and 57% of fall-run chinook fry were consumed by piscivorous fish in the Tuolumne River, California.

- The model predicts that if the Striped Bass population declines to 512,000 adults as expected in the absence of stocking, winter-run Chinook Salmon will have about a 28% chance of quasi-extinction (defined as three consecutive spawning runs of fewer than 200 adults) within 50 years. If stocking stabilizes the Striped Bass population at 700,000 adults, the predicted quasi-extinction probability is 30%. A more ambitious stocking program that maintains a population of 3 million adult Striped Bass would increase the predicted quasi-extinction probability to 55%.

**Overall.** Striped Bass predation at the current population level may be a nontrivial source of mortality for winter-run Chinook Salmon. Striped Bass may have declined along with winter-run Chinook Salmon, so predicted predation impacts may have changed. A significant increase in Striped Bass abundance could substantially increase the risk of winter-run Chinook Salmon extinction and reduce the likelihood of recovery. What constitutes a “significant increase” is not defined.

## **Nobriga et al. 2021**

Nobriga, M.L., Michel, C.J., Johnson, R.C., and J.D. Wikert. 2021. Coldwater fish in a warm water world: Implications for predation of salmon smolts during estuary transit. *Ecology and Evolution*, 11:10381–10395. DOI 10.1002/ece3.7840

**Funding Source.** USFWS and NMFS.

**Study Period.** 2012-2019.

**Geographic Range.** Sacramento River Basin.

**Predator assemblage evaluated.** Striped Bass and Largemouth bass (LMB).

**Prey species detected.** Predation Event Recorders (PERS) were employed using tethered, drifting hatchery Fall-run Chinook Salmon.

**Key Findings.**

- Neither distance from shore nor water temperature was observed to influence the willingness of Striped Bass to attack PERs, which supports the assertion that Striped Bass are temperate pelagic predators. Largemouth Bass attacked PERs most frequently in warmer water, near shorelines. Thus, as temperatures warm, Chinook Salmon face higher near shore predation risk.
- PERS data suggests the combined effect of Striped Bass and LMB appears additive, Striped Bass predation rates remained the same as LMB predation increased with warmer temperatures.
- Modeled Striped Bass prey consumption was 17 g/day and was consistent across water temperatures, while Largemouth Bass prey consumption increased with increasing temperatures. The per capita quantitative impact of LMB on Chinook Salmon was about half that of Striped Bass.

**Overall.** Chinook Salmon survival is generally water temperature dependent. Striped Bass predation does not seem to depend on temperature, while LMB feeding does. Simulation models predict LMB predation impacts to be comparatively lower than Striped Bass. Hypotheses for future research are listed below:

- If Striped Bass adults resume foraging quickly after spawning, this would coincide with smolt outmigration. At warmer temps, this would predict lower smolt survival as a function of water temperature. To test this, a study investigating post-spawn resumed foraging times for Striped Bass is recommended.
- LMB have an undocumented but substantial impact on Chinook Salmon. Increase in submerged aquatic vegetation (SAV) increases water clarity and allowed LMB to proliferate and enabled large increases in LMB in the past three decades. Population estimates of LMB would be useful in better understanding impacts on Chinook Salmon.
- Disease could be playing a more substantial role in survival than previously thought. Salmon typically survive in 20°C temps in hatchery conditions, so temperature alone shouldn't impact survival. Higher disease at these temperatures in the wild could impact swimming speeds, which would leave salmon more vulnerable to predation.

# **Wildlife Prosecutor of the Year**

It is the policy of the Fish and Game Commission to honor a courtroom champion of California's fish, wildlife and natural resources, a person who tirelessly prosecutes fish, wildlife, natural resource and environmental crimes in California courts. The Commission will recognize this prosecutor through an annual Wildlife Prosecutor of the Year Award.

## **Eligibility**

Any currently seated prosecuting attorney, including, but not limited to, city attorney, district attorney or deputy attorney general is eligible for nomination and the contribution(s) must have occurred during the previous three years.

## **Nominations**

Based on input from wildlife officers and their experiences in the field, the California Department of Fish and Wildlife's deputy director and chief, Law Enforcement Division, may submit up to four nominations. The nominations must be submitted to a selection committee (identified below) no later than March 15.

## **Selection Criteria**

The award recognizes one attorney who exhibits one or more of the following:

1. exceptional skill and an outstanding commitment to protecting California's fish, wildlife and natural resources;
2. superior performance in prosecuting wildlife, natural resource and environmental crimes;
3. relentless pursuit of justice for the most egregious violators and keen ability to prosecute complex, controversial or landmark cases; or
4. exemplary work promoting and maintaining a collaborative working relationship with wildlife officers in pursuit of conserving our natural resources.

## **Selection Committee**

The selection committee will consist of the president and the executive director of the Commission, and the Department of Fish and Wildlife's director and deputy director, Law Enforcement Division.

## **Award Announcement**

The award will be announced at the Commission's meeting in June and presented to the recipient during a future event agreed upon by the selection committee where the prosecutor can be recognized for his or her efforts. The Commission will distribute a news release announcing the prosecutor of the year and showcasing the exemplary work and contributions to protecting California's fish and wildlife resources.

(Adopted: 06/22/2016; Amended; 08/07/2019)

**State of California  
Department of Fish and Wildlife**

**M e m o r a n d u m**

**To:** Chief Nathaniel Arnold  
Deputy Director  
Law Enforcement Division

**From:** Chris Stoots  
Assistant Chief  
Northern Enforcement District  
Law Enforcement Division

**Subject: Michael Tufaro for Wildlife Prosecutor of the Year Award**

The Northern Enforcement District proudly nominates Butte County Deputy District Attorney (DDA) Michael Tufaro as the California Fish and Game Commission Wildlife Prosecutor of the Year.

DDA Tufaro has worked tirelessly throughout his ten-year career with the Butte County District Attorney's Office to prosecute natural resource and wildlife crimes as well as support the efforts of Wildlife Officers engaged in apprehending such violators. DDA Tufaro is constantly and relentlessly engaged in working with officers and his coworkers to be better informed and to better educate others in the importance of natural resources and the prosecution of violations associated with damaging such.

DDA Tufaro has made a huge impact on resource violators in all of Northern California, not just specifically Butte County where he works and resides. DDA Tufaro has repeatedly been in contact with Wildlife Officers in various counties north of Sacramento during all hours of the day and night to assist with legal questions, authoring search warrants, reviewing search warrants, providing legal guidance and assisting from the perspective of the prosecution for resource and environmental crimes. DDA Tufaro has taken ample time out of his personal and professional life to educate defense attorneys as well as prosecuting attorneys in other counties dealing with resource crimes and ensuring prosecution is done justly and swiftly throughout the north state.

In 2024 alone, DDA Tufaro reviewed, approved and assisted with authoring dozens of Fish and Wildlife specific search warrants within Butte County and throughout the north state. DDA Tufaro took the time to work with new officers on Field Training to author search warrants to aid in the successful prosecution of their cases. DDA Tufaro's time spent with trainees will last with them for an entire career and give them confidence in future investigations to author search warrants. The search warrants were authored for crimes related to combating unpermitted cannabis cultivation sites severely impacting flora and fauna in sensitive areas, unlawful possession of wildlife out of season, unlawful take of wildlife, unlawful possession of firearms by prohibited persons, unlawful importation of restricted species, unlawful importation of endangered species, animal cruelty, unlawful take of fully protected mammals, unlawful take of specially protected mammals and the seizure of conveyances used in the commission of wildlife crimes. It

should be noted that some of these search warrants were authored late at night in other jurisdictions, however DDA Tufaro's dedication and commitment to the resources of the State of California were insurmountable and his assistance was invaluable to the successful outcomes of the various cases where search warrants were needed.

Cases of note in 2024 where DDA Tufaro contributed greatly to the apprehension and prosecution of those taking advantage of the precious resources of the state, did stem from Butte County.

1. DDA Tufaro reviewed and approved Ping Warrants and Ramey Warrants for subjects who were found to be in possession of over 40 poached buck deer, dynamite and other resource violations. The case was made by an officer on Field Training and DDA Tufaro assisted the new officer with authoring a search warrant for phones seized at the location. DDA Tufaro is the lead prosecutor on this case and assisted the new officer in preparing for courtroom testimony at a preliminary hearing where the subjects were ultimately held to answer on the charges brought forth, which will result in a lengthy prison sentence for one or both subjects.
2. DDA Tufaro assisted Wildlife Officers author a ping warrant to apprehend a subject that fled from custody and led officers on a dangerous pursuit while handcuffed after being caught attempting to loot in an evacuating fire zone, during an active wildland fire. DDA Tufaro assisted in coordinating the California Highway Patrol and a group of Wildlife Officers to perform a takedown of the suspect based on his ping warrant location. DDA Tufaro successfully prosecuted this case as well as those who assisted in the suspect's escape from custody.
3. DDA Tufaro successfully prosecuted a subject for unlawfully drowning a buck deer with his vessel. The subject in the case tortured the buck deer and drowned it, leaving it on the side of the river to retrieve a tag and make the deer appear lawful. DDA Tufaro assisted a newer Wildlife Officer in authoring his first search warrant and went on the service of the search warrant to seize the subject's vessel and other evidence. This subject was successfully prosecuted by DDA Tufaro and forfeited his brand-new boat to the Department as part of his punishment for the heinous resource violation.
4. DDA Tufaro assisted with the authoring, execution and prosecution of multiple subjects who were caught smuggling a sea turtle into California from New York. These subjects also admitted to undercover Wildlife Officers they had unlawfully shot a mountain lion. Upon service of the search warrant with DDA Tufaro the subjects were found in possession of an unlawful deer they took the day of the search warrant, a ringtail cat, mountain lion parts, owl parts, sea turtle parts and evidence of various other wildlife crimes. This case then led to a "piggyback" type warrant where DDA Tufaro assisted with authoring and reviewing a search warrant to be served in Napa County. This "piggyback" warrant out of Napa County yielded two unlawfully possessed specially protected mountain lions and a fully protected mammal wolverine. DDA Tufaro successfully prosecuted the case and received convictions of several resource violations, forfeiting all evidence and placing the subjects on probation for two years prohibiting hunting.

One of the most significant and controversial cases handled by DDA Tufaro occurred in 2020 through 2022 in north Butte County. DDA Tufaro responded to a Wildlife Officer's call for assistance when a local contractor and business owner was found actively



dumping commercial quantities of suspected asbestos into a creek bank at a residence, from a dump truck, within a residential neighborhood. DDA Tufaro immediately responded to the Wildlife Officer's location, finding the officer covered with asbestos debris from the subject attempting to conceal the hazardous and extremely egregious violations. DDA Tufaro coordinated a response team from the Environmental Investigators unit of the Butte County District Attorney's Office. DDA Tufaro was instrumental in freezing the property, authoring a search warrant with investigators, coordinating a special sampling lab to confirm asbestos presence, executing the search warrant and vigorously pursuing justice while prosecuting the extremely complex and scientifically advanced case. DDA Tufaro fought for justice and professional restoration of the creeks and waterways affected as well as caring for the citizens residing in the neighborhood where this atrocity occurred. DDA Tufaro's vigorous and passionate prosecution yielded several hundred thousand dollars in fines, convictions on felony environmental charges, 120 days jail time for the suspect and significant probation terms.

DDA Tufaro eagerly prosecutes serious Fish and Wildlife crimes in Butte County, specially requesting such be routed to his prosecutorial file in the Butte County District Attorney's office so they are handled with aggressive professionalism. Due to the case load of DDA Tufaro and his willingness to take on these serious cases, in addition to his regular case load that often stems from search warrants or serious events, his ability to focus on minor Fish and Wildlife crimes decreases. However, DDA Tufaro repeatedly spends time with his peers or subordinates to educate them on resource crimes, the elements of such, and prosecution techniques, giving them a better understanding and instilling his passion and exemplary work into those around him to further preserve our natural resources and environment.

There is no other prosecuting attorney in the State of California more deserving of such award than Deputy District Attorney Michael Tufaro; his passion and love for the beautiful resources in the state shine bright through his hard work and dedication to preserving such in his personal and professional life.

It is with great pleasure, the Northern Enforcement District nominates Michael Tufaro as the 2024 Wildlife Prosecutor of the Year.

# FGC 1 Petition to the California Fish and Game Commission for Regulation Change

**Submitted to the California Fish and Game  
Commission**

**Pursuant to Title 14, Section 671 –  
Restricted Species List**



Tracking Number: (\_\_\_\_\_)

To request a change to regulations under the authority of the California Fish and Game Commission (Commission), you are required to submit this completed form to: California Fish and Game Commission, (physical address) 1416 Ninth Street, Suite 1320, Sacramento, CA 95814, (mailing address) P.O. Box 944209, Sacramento, CA 94244-2090 or via email to FGC@fgc.ca.gov. Note: This form is not intended for listing petitions for threatened or endangered species (see Section 670.1 of Title 14).

Incomplete forms will not be accepted. A petition is incomplete if it is not submitted on this form or fails to contain necessary information in each of the required categories listed on this form (Section I). A petition will be rejected if it does not pertain to issues under the Commission's authority. A petition may be denied if any petition requesting a functionally equivalent regulation change was considered within the previous 12 months and no information or data is being submitted beyond what was previously submitted. If you need help with this form, please contact Commission staff at (916) 653-4899 or FGC@fgc.ca.gov.

## **SECTION I: Required Information.**

*Please be succinct. Responses for Section I should not exceed five pages*

### **1. Person or organization requesting the change (Required)**

Name of primary contact person: Pat Wright

Address: [REDACTED]

Telephone number: [REDACTED]

Email address: [REDACTED]

### **2. Rulemaking Authority (Required) - Reference to the statutory or constitutional authority of the Commission to take the action requested:**

The California Fish and Game Commission (Commission) has the statutory authority to regulate the classification of animals under California Fish and Game Code § 2118, which governs the importation, transportation, and possession of wild animals. However, this authority is constrained by California Fish and Game Code §§ 2116 and 2116.5, which define wild animals as those not normally domesticated in California or elsewhere.

The Commission previously removed *Bubalus bubalis* (Asian water buffalo) from the prohibited species list after receiving scientific input confirming their domestic status and regulatory alignment with livestock laws. Given the well-documented domestic status of ferrets (*Mustela putorius furo*), the Commission has the authority to amend regulations accordingly. Furthermore, the California Administrative Procedure Act (APA) (California Government Code §§ 11340.6 and 11340.7) requires the Commission to consider petitions fairly and provide reasoned justifications for regulatory decisions.

### **• Overview (Required) - Summarize the proposed changes to regulations:**

This petition requests that the California Fish and Game Commission amend Title 14, Section 671 of the California Code of Regulations to remove domestic ferrets (*Mustela putorius furo*) from the list of restricted species. This change would align California's regulations with the federal government and 48



other states **【36†source】** , recognizing ferrets as domesticated animals. This classification update would:

Facilitate responsible ownership;

Eliminate unnecessary criminalization;

Allow proper regulation under existing pet laws.

### **3. Rationale (Required) - Describe the problem and the reason for the proposed change**

#### **1. Domestic Ferrets Are Not Wild Animals**

- **Scientific Consensus:** Ferrets have been bred in captivity for over **2,000 years** and are recognized as domestic by the **USDA, AVMA, and 48 other states** **【31†source】** .

- **Legal Definitions:** Under **California Fish and Game Code §§ 2116 and 2116.5**, a wild animal is one that is “not normally domesticated in this state or elsewhere.” Ferrets **do not meet this definition** **【28†source】** .

- **California Civil Code § 655** explicitly states that “there may be ownership of all domestic animals,” reinforcing that ferrets fall under this classification **【30†source】** .

#### **2. No Evidence of Environmental Risk**

- **No Established Feral Populations:** Decades of illegal ownership in California have produced **no feral populations**, consistent with findings from **peer-reviewed studies** **【38†source】** .

- **Environmental Reports Disprove Risk:** A **2010 Fish and Game-commissioned report**, finally peer-reviewed in 2020, **found no evidence** that domestic ferrets pose a unique threat **【27†source】** .

#### **3. Public Safety and Responsible Ownership**

- **Minimal Bite Risk:** Ferrets bite at significantly **lower rates than dogs or cats** **【29†source】** .

- **Vaccination and Health Measures:** Ferrets can be **vaccinated against rabies**, as confirmed by **CDC protocols** **【33†source】** .

- **Regulation Through Licensing:** Legalization would allow oversight, including **licensing and vaccination requirements**, rather than fostering an **unregulated underground market**.

#### **4. Regulatory Precedent: Asian Water Buffalo Legalization**

- **Similar Reclassification Process:** The **Commission removed the Asian water buffalo from the prohibited species list** after confirming domestic status **【40†source】** .

- **Application to Ferrets:** Ferrets have long been classified as **domestic animals**, supported by extensive **scientific literature** **【31†source】** . Amending **Title 14, Section 671** would ensure **consistency in domestic animal classification**.

#### **5. Lack of Justification for Ferret Classification & Commission Obstruction**

- A **Public Records Act request** revealed **no hearings, studies, or documents** justifying why ferrets were originally classified as wild and detrimental.

- **Video evidence from the August 22, 2023, Fish and Game Commission Meeting** (<https://youtu.be/eY4oXI2Uq2k?si=kiOn0DfICci2VCzm>) confirms that:

- The Commission **falsely claimed** that an **EIR must be funded by proponents**, despite multiple attempts by petitioners to begin the process.

- The Commission has **ignored certified correspondence** confirming readiness for an **EIR process**.



## **SECTION II: Optional Information**

The continued classification of domestic ferrets as wild and detrimental lacks scientific, legal, and regulatory justification. California remains the only state enforcing this outdated prohibition. By updating the regulations to reflect current scientific knowledge and aligning with established regulatory practices, the Commission can correct this long-standing misclassification while ensuring responsible ownership.

4. **Date of Petition:**
5. **Category of Proposed Change**
- ☐ Sport Fishing
  - ☐ Commercial Fishing
  - ☐ Hunting
  - ☐ Other, please specify:
6. **The proposal is to:** *(To determine section number(s), see current year regulation booklet or <https://govt.westlaw.com/calregs>)*
- ☐ Amend Title 14 Section(s):
  - ☐ Add New Title 14 Section(s):
  - ☐ Repeal Title 14 Section(s):
7. **If the proposal is related to a previously submitted petition that was rejected, specify the tracking number of the previously submitted petition**
- #2016-008  
#2016-031  
#2019-018  
Or ☐ Not applicable.
8. **Effective date:** If applicable, identify the desired effective date of the regulation.  
If the proposed change requires immediate implementation, explain the nature of the emergency:
10. **Supporting documentation:** Identify and attach to the petition any information supporting the proposal including data, reports and other documents:
- Exhibit A: Fish and Game Code § 2116
  - Exhibit A2: Fish and Game Code § 2116.5
  - Exhibit B: Proof of Domestic Status
  - Exhibit C: California Civil Code § 655
  - Exhibit D: Ferret Bite Statistics
  - Exhibit D2: Ferret Rabies Vaccine
  - Exhibit D2 Explanation
  - Exhibit E: Original Environmental Report
  - Exhibit E2: Peer-Reviewed Environmental Report
  - Exhibit E2 Explanation
  - Exhibit E3: Impacts of Domesticated Ferrets Peer Reviewed
  - Exhibit F: Legal Status of Ferrets in 48 States
  - Exhibit G: Lack of Feral Ferret Populations



Exhibit H: FGC Response Letter (10-day Wright P.)

Exhibit I: Staff Summary for October 19, 2016

**11. Economic or Fiscal Impacts:** Identify any known impacts of the proposed regulation change on revenues to the California Department of Fish and Wildlife, individuals, businesses, jobs, other state agencies, local agencies, schools, or housing:

The prohibition of domestic ferrets in California has created unnecessary economic burdens on residents, small businesses, and government agencies. The legalization of ferrets would have several **positive economic impacts**:

**Revenue Generation for the State**

Licensing fees, similar to dog and cat ownership, could generate significant revenue.

Taxes from pet-related sales, including ferret food, cages, bedding, and veterinary services, would contribute to California's economy.

**Increased Business for Pet Stores & Veterinary Clinics**

Currently, California pet stores are unable to legally sell ferret-related products, **forcing residents to purchase them from out-of-state vendors**.

Veterinary clinics are already treating ferrets illegally owned in the state, but **legalization would allow them to openly provide services, increasing revenue**.

**Reduction in Law Enforcement & Legal Costs**

Enforcement of ferret bans wastes **government resources**, including time spent on confiscation and prosecution.

Eliminating the ban would **reduce legal and administrative costs** associated with enforcing the restriction.

**Consumer Protection & Safety**

Legalizing ferrets would **ensure proper regulation of breeding and sales**, leading to **higher animal welfare standards**.

**Microchipping and vaccination programs** could be implemented to protect both ferrets and the public.

**Tourism & Relocation Incentives**

Many prospective residents and businesses **avoid moving to California due to restrictive pet laws**.

Ferret legalization would remove a barrier for thousands of pet owners who currently **face fines or eviction for owning a domesticated pet legal in 48 other states**.

**Conclusion**

The continued restriction of domestic ferrets is **economically inefficient and harmful to California businesses**. Legalization would generate new revenue streams, reduce enforcement costs, and improve consumer protection while aligning the state with national standards.

**12 Forms:** If applicable, list any forms to be created, amended or repealed:

[\[Click here to enter text. \]](#)

**SECTION 3: FGC Staff Only**

Date received: [\[Received March 11, 2025\]](#)





FGC staff action:

- ☐ Accept - complete
- ☐ Reject - incomplete
- ☐ Reject - outside scope of FGC authority

Tracking Number

Date petitioner was notified of receipt of petition and pending action: \_\_\_\_\_

Meeting date for FGC consideration: \_\_\_\_\_

FGC action:

- ☐ Denied by FGC
- ☐ Denied - same as petition \_\_\_\_\_

Tracking Number

- ☐ Granted for consideration of regulation change

**State of California**

**FISH AND GAME CODE**

**Section 2116**

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2116. As used in this chapter, “wild animal” means any animal of the class Aves (birds), class Mammalia (mammals), class Amphibia (frogs, toads, salamanders), class Osteichthyes (bony fishes), class Monorhina (lampreys), class Reptilia (reptiles), class Crustacea (crayfish), or class Gastropoda (slugs, snails) which is not normally domesticated in this state as determined by the commission.

(Amended by Stats. 1974, Ch. 1503.)

Exhibit A provides the legal definition of wild animals under California Fish and Game Code § 2116. This definition is critical to our petition, as it establishes that wild animals are those "not normally domesticated in this state or elsewhere." Given the overwhelming evidence of ferrets' long-standing domestication, their continued classification as wild animals is legally incorrect. This exhibit supports our argument that the Commission has a statutory obligation to correct this misclassification.

**State of California**

**FISH AND GAME CODE**

**Section 2116.5**

---

2116.5. The Legislature finds and declares that wild animals are being captured for importation and resale in California; that some populations of wild animals are being depleted; that many animals die in captivity or transit; that some keepers of wild animals lack sufficient knowledge or facilities for the proper care of wild animals; that some wild animals are a threat to the native wildlife or agricultural interests of this state; and that some wild animals are a threat to public health and safety. It is the intention of the Legislature that the importation, transportation, and possession of wild animals shall be regulated to protect the health and welfare of wild animals captured, imported, transported, or possessed, to reduce the depletion of wildlife populations, to protect the native wildlife and agricultural interests of this state against damage from the existence at large of certain wild animals, and to protect the public health and safety in this state.

(Added by Stats. 1974, Ch. 1503.)

Exhibit A-2 provides additional statutory clarification under California Fish and Game Code § 2116.5, which defines wild animals as those not normally domesticated in this state or elsewhere. Given that domestic ferrets have been bred in captivity for thousands of years and are legally recognized as domestic animals in 48 other states, this provision supports our position that ferrets do not meet the legal definition of a wild animal and should not be regulated as such by the Commission.

## Exhibit B

Exhibit B establishes the domestication of ferrets through historical, behavioral, and biological evidence. It highlights their long association with humans, controlled breeding, behavioral changes from wild counterparts, and their historical use for rodent control. These factors align with domestication criteria recognized by scientific and regulatory authorities, reinforcing that ferrets do not meet the legal definition of a wild animal under California Fish and Game Code §§ 2116 and 2116.5. This exhibit is crucial in demonstrating that ferrets should not be classified or regulated as wild animals in California.

What is the most authoritative proof that domestic ferrets are domestic?

ChatGPT

The domestication of ferrets is supported by historical evidence, behavioral characteristics, and their long association with humans. While there might not be a single "most authoritative" proof, a combination of factors contributes to the understanding of ferrets as domesticated animals. Here are some key points that support the domestication of ferrets:

- 1. Historical Use:**

- Ferrets have been historically used by humans for specific purposes, such as hunting rodents. References to ferrets can be found in ancient texts, including Grecian plays from 450 BC and Roman documents around the time of Christ. This historical association with humans for specific tasks is indicative of domestication.

- 2. Controlled Reproduction:**

- Domesticated animals typically have their reproduction controlled by humans. Humans have actively controlled ferret breeding for a long time, selecting for specific traits, behaviors, and characteristics.

- 3. Behavioral Changes:**

- Domestic ferrets exhibit behavioral changes from their wild counterparts, including a decrease in aggressive behaviors. They also demonstrate the ability to live in groups, which is not common among wild animals of the same species. These behavioral changes are common consequences of domestication.

- 4. Physical Changes:**

- Domestic ferrets show physical changes compared to wild counterparts, including variations in fur color (albinism), body size, and skull shape. These changes are often associated with the domestication process.

- 5. Long Association with Humans:**

- Ferrets have been associated with humans for thousands of years, providing companionship and serving utilitarian purposes. This long and close association supports the idea of domestication.

- 6. Usefulness to Humans:**

- One criterion for domestication is that the species should provide a service or product that is useful to humans. Ferrets historically served as effective hunters of rabbits and rodents, contributing to their usefulness.

While each of these points contributes to the understanding of ferrets as domesticated, it's the combination of these factors that provides a strong case for their domestication. Additionally, scientific studies and historical records collectively support the notion that ferrets are domestic animals. The exhibit you've mentioned earlier, labeled as Exhibit B: Proof of Domestication, seems to capture some of these elements and can be a valuable reference in your case.



[Go to previous versions of this Section](#)



# 2022 California Code

## Civil Code - CIV

### DIVISION 2 - PROPERTY

### PART 1 - PROPERTY IN GENERAL

### TITLE 1 - NATURE OF PROPERTY

## Section 655.

**Universal Citation:** CA Civ Code § 655 (2022)

655. There may be ownership of all inanimate things which are capable of appropriation or of manual delivery; of all domestic animals; of all obligations; of such products of labor or skill as the composition of an author, the good will of a business, trade marks and signs, and of rights created or granted by statute.

*(Enacted 1872.)*

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Exhibit C presents California Civil Code § 655, which legally defines domestic animals as property. This is significant because it reinforces that domesticated animals, including ferrets, are distinct from wild animals under California law. Since ferrets have been bred in captivity for thousands of years and are classified as domestic in 48 other states, their continued classification as wild under California Fish and Game regulations contradicts this legal standard. This exhibit supports our argument that the Commission must recognize ferrets as domestic animals in accordance with established property law.

## Exhibit D

### **\*\*Exhibit: Absence of Official Ferret Bite Statistics in the USA\*\***

*Exhibit D emphasizes the absence of official, systematic data on ferret bites in the United States. Unlike dogs and cats, ferrets do not have a well-documented history of bites recorded at a national level, suggesting that concerns about their public safety risk are largely speculative. The lack of such data undermines any justification for classifying ferrets as dangerous or restricting their ownership. This exhibit supports the argument that ferrets should be evaluated based on actual evidence rather than unverified assumptions about their behavior.*

As of the date of this petition, there is a notable absence of official and comprehensive statistics regarding ferret bites in the United States. Unlike more common pets such as dogs and cats, ferrets do not have a well-documented history of bites that is systematically recorded and reported at a national level.

Efforts to locate statistical data on ferret bites have been inconclusive, indicating a gap in official records or studies specific to ferret-related incidents. The limited availability of such statistics may be attributed to the relatively smaller population of ferrets as pets compared to more prevalent domestic animals.

This exhibit aims to highlight the challenge in obtaining official ferret bite statistics, emphasizing that the absence of such data contributes to the complexity of assessing the frequency and severity of ferret bites on a national scale. In the absence of comprehensive statistics, it is crucial to consider alternative sources of information, including veterinary records, animal control reports, and community forums.

While ferret bites, if they occur, can have consequences, the scarcity of official statistics underscores the need for further research and data collection to better understand and address any potential issues associated with ferret ownership.

## Exhibit D2 Explanation

Exhibit D-2 exposes the misleading claims made by the California Department of Fish and Game regarding the availability of a rabies vaccine for ferrets. The agency has falsely asserted that no approved vaccine exists, in part because ferrets are illegal. At the same time, they justify keeping ferrets illegal by citing the supposed lack of an approved vaccine. This circular reasoning has been used to block responsible ferret ownership in California. The manufacturer of the ferret rabies vaccine was forced to step in to correct the misinformation due to the damage it caused to their credibility. This exhibit highlights the long-standing dishonesty we have faced and underscores the need for regulatory reform based on facts rather than misrepresentation.

132

Rhone Merieux

EXH:G.T 11

6 April 1994

Mr. Boyd Gibbons  
Director  
California Department of Fish & Game  
1419 9th Street  
Sacramento, California 95814

Re: IMRAB® RABIES VACCINE FOR FERRETS

Dear Mr. Gibbons:

Rhone Merieux is the manufacturer of IMRAB®, a killed rabies vaccine which has been approved by the USDA for use in six species of animals, including ferrets. It has come to our attention that your Department has been publishing false and misleading information about IMRAB®; both within California and perhaps in other states. We have reviewed the attached March 25, 1994 "Ferret Fact Sheet," and we believe that the comments made about our vaccine are false and misleading to the intended reader.

IMRAB® rabies vaccine, killed virus, has been tested for safety, purity and effectiveness in accordance with the Code of Federal Regulations, Section 9 (9CFR), part 113.209 as issued and regulated by the APHIS of the USDA.

As a result of this testing in accordance with 9CFR 113.209 the USDA has approved IMRAB® as a safe, pure and effective rabies vaccine for use in six species of animals including ferrets.

The criterion for demonstrating protection in ferrets (9CFR 113.209 63V) was the same as used to demonstrate the vaccine's effectiveness in dogs, cats and other species. In fact, the rabies protection afforded ferrets (94.4%) vaccinated with IMRAB® exceeded the minimum protection level required (86.7%) for USDA license approval for dogs, cats, etc.

It appears your source of information regarding IMRAB® was not accurate and we ask that you cease and desist any further publications or commentary which do not accurately reflect the proven efficacy or safety of our IMRAB® product. We also request that you issue retractions of your statements to anyone to whom they were published or mentioned and that you submit copies of your retractions to my

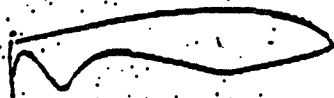
gibbons (dh20)

attention.  
6 April 1994  
Page two

As a company, RMI is working very hard to develop, manufacture and distribute quality, proven vaccines for use by the veterinary community. We are most seriously concerned when someone tries to destroy the integrity of our products without just cause.

Please feel free to contact me if you any questions or wish to discuss the matter.

Very truly yours,



Donald G. Hildebrand  
President

DGH:sb

## Exhibit E

Exhibit E presents the original environmental report evaluating the potential impact of domestic ferrets in California. This report is significant as it lays the groundwork for assessing whether ferrets pose a threat to native wildlife or ecosystems. By including this exhibit, we demonstrate that environmental concerns related to ferrets have been formally studied and can be addressed through factual analysis rather than speculation. This is crucial in countering any arguments that maintaining the ferret ban is necessary for environmental protection.



**ANALYSIS OF THE POTENTIAL IMPACTS  
OF DOMESTICATED FERRETS  
UPON WILDLIFE, AGRICULTURE, AND HUMAN HEALTH  
IN NORTH AMERICA, WITH A FOCUS UPON CALIFORNIA,  
BASED UPON LITERATURE REVIEW AND  
SURVEY OF NORTH AMERICAN GOVERNMENTAL AGENCIES**

University Enterprises, Inc., Grant Number 517021

13 September 2010

Prepared for:

California Fish and Game Commission

Prepared by:

G. O. Graening, PhD, MSE

Department of Biological Sciences  
California State University, Sacramento  
6000 J Street, Sacramento, CA 95819

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## DISCLAIMER

The statements made in the following report do not necessarily represent the views of the California Fish and Game Commission, the California Department of Fish and Game (CDFG), or California State University, Sacramento (CSUS). Any views or opinions expressed are solely those of the author. Nothing stated in this report should be construed as an attempt to offer or render a legal opinion, legal advice, or otherwise engage in the practice of law. Nothing stated in this report should be construed as an attempt to offer or render a medical opinion, medical advice, or otherwise engage in the practice of medicine.

## ABSTRACT

This study attempted to fully summarize the body of knowledge on the domesticated European ferret (*Mustela putorius furo*) as it pertains to potential impacts upon the environment, particularly wildlife, agribusiness, and human health, via a thorough literature review and a survey of wildlife, agriculture, and health departments in the USA and Canada. Secondly, this study attempted to perform an impact analysis to identify potentially significant issues and any need for further analyses so that the California Fish and Game Commission could proceed with the preparation of an Environmental Impact Report (EIR), which is a necessary step in the consideration of citizens' petitions to alter the California Fish and Game Code so that ferrets can be imported and possessed legally in California.

A historical timeline of regulations and policies concerning ferrets in California was provided. The two basic paths to the legalization of ferrets (enacting legislation or changing State policy) were analyzed. Enacting legislation is the most immediate way to legalize ferrets in California, but requires significant amounts of money and public support that pro-ferret organizations have not yet obtained. This method does not require California Department of Fish and Game (CDFG) support or any environmental impact review process. To legalize ferrets in California by a policy change, CDFG concerns would need to be addressed and mitigated. CDFG is concerned with the cost of managing a regulatory program for ferrets, and CDFG would need assurance or proof that fertile ferrets, hybrids, or even polecats will not establish feral breeding populations and impact wildlife. Various strategies have been suggested to test whether or not ferrets could establish feral breeding populations and impact wildlife: analysis of case studies involving unconfined ferrets or polecats; performance of a controlled experiment or pilot study; or performance of a risk analysis or cost-benefit analysis. Some of the potential economic impacts of ferret legalization were discussed, and these impacts, both adverse and beneficial, may need to be analyzed further in the EIR.

Historically, the regulatory classification of ferrets was an important issue because the regulatory authority of some State agencies depended upon whether the animal was classified as wildlife/exotic animal or a domesticated animal/pet. With the advent of sterilization techniques and vaccines, most State agencies and non-governmental organizations now recognize the ferret as a pet or domesticated animal. There is little consensus among States as to ferret's regulatory status. At least 10 States have never regulated ferrets. Only California and Hawai'i ban ferret importation and possession. Many States and municipalities now regulate ferrets as a pet and require vaccinations. The great majority of States did not use an environmental impact review process during regulatory actions regarding the ferret.

The taxonomy and morphology of the ferret's genus *Mustela* is not definitive (*i.e.*, the genus is paraphyletic). *Mustela* is considered a Holarctic species complex that is unresolved due to hybridization. The taxon *Mustela putorius* is considered by many mammalogists to be a genotypic and phenotypic spectrum, with the wild polecat at one end and the domesticated ferret at the other end. The literature suggests that for several thousand years, humans have captively and selectively bred polecats to produce domesticated varieties, called *ferret*, that served as hunting companions, pets, or for rodent control. Since ferrets are often back-bred with polecats, each ferret lineage may be relatively ancient or modern, and may fall anywhere within the polecat-ferret spectrum in terms of its behavior and fitness. Cranial morphometrics are the only reliable way to differentiate polecats from ferrets and these taxonomic difficulties may pose a challenge to the regulation of ferrets. The ferret is widely distributed in Europe, and has been introduced far outside of its native range, especially New Zealand. The great majority of the published literature does not consider the ferret or polecat to be an established wild mammal in North America.

The enumeration of ferret populations, both as pet and laboratory subject, in USA and California is important for many reasons. No scientific census of ferrets has ever been performed in the USA; all existing estimates are based upon opinion or extrapolation of pet owner surveys or ferret product sales. Published estimates for total numbers of pet ferrets in the USA for the range from 275,000 to 10,000,000, and in California, range from 30,000 to 1,000,000.

The literature indicates that ferrets can and do escape confinement, and that accidental or intentional releases of ferrets into the environment do occur. It does not appear to be possible to completely eliminate the risk of a ferret escaping confinement in California. Ferrets have some, but not all, of the life history traits of an ideal invader species. The literature is divided on the issue of whether domesticated ferrets can revert to a feral condition and survive in the wild. The case studies of feral ferrets in New Zealand and other parts of the World demonstrate that mustelids within the polecat-ferret spectrum can establish breeding populations and adversely impact wildlife. It is not clear whether the American domesticated pet ferret can be directly compared to these feral populations, and whether they can be assigned the same risk of establishment and adverse impact upon the environment. All of the ideal conditions for establishment of a feral ferret population have not yet been met in California: a moderate climate, a superabundance of preferred prey, a community devoid of competitors and predators, and repeated introductions of large founding populations. Predation and competition from California's wildlife may be important factors that limit the success of the establishment of a feral ferret population.

Surveys of State agencies revealed a data deficiency in the enumeration of stray or feral exotic mustelids in the USA. A great majority of State agency personnel responded that there were not, or probably were not, any established feral ferret breeding populations in their States, and most State agencies responded that it was not considered important to assess the status of domesticated ferrets in the wild. Only California and Hawai'i agency personnel gave strong objections to the importation or possession of ferrets.

While sterilized ferrets have no potential to establish breeding populations, popular pet manuals indicate that the breeding of ferrets, and the ownership of hybrids, are desired by a portion of the pro-ferret community. With or without regulations, the State of California cannot completely prevent the importation of fertile ferrets, polecat-ferret hybrids, or polecats. Thus, some risk of feral breeding populations establishing in California still remains; no author or scientist has been able to convincingly enumerate this risk. Any ferret legalization action may need to assure CDFG that there is no possibility that hybrids or polecats are imported into California, or to demonstrate that hybrids and polecats do not pose a threat to the environment if they are released into the wild. The Commission may require adherence to its Miscellaneous Policies: Introduction Of Non-Native Species, which requires such assurances and demonstrations of no potential adverse effect upon wildlife. This potentially significant impact upon wildlife of the establishment of a feral breeding population of ferrets may need to be analyzed further in the EIR.

The literature documents that ferrets may have impacted European (residential) poultry production, especially in the late 19<sup>th</sup> and early 20<sup>th</sup> century. The literature is largely devoid of any instances of ferrets impacting agricultural resources in the USA, except for anecdotal accounts. USA has, for the most part, phased out household poultry and egg production and now relies almost exclusively on commercial confined animal feeding operations; these facilities may be better protected from predators than traditional residential hen houses. Questionnaires of agricultural departments in the USA has not revealed any major impacts upon agribusiness resulting from ferrets, or any major opposition to ferret ownership; where agricultural agency personnel have responded negatively to ferret legalization/ownership, their concerns focused on the risk of ferrets biting humans or on the risk of ferrets establishing feral breeding populations, and not on the impact upon agricultural resources. This issue may not need to be analyzed further in the EIR.

The medical community and various State agencies have reversed their stance on rabies issues pertaining to ferrets, from emphatic statements in the 20<sup>th</sup> century that ferrets are not appropriate pets because of their proclivity to bite and the absence of an approved rabies vaccine, to neutral statements in the 21<sup>st</sup> century that ferrets should receive rabies vaccinations like other household pets. The Centers for Disease Control and Prevention stated that currently in the USA rabies is a rare disease and is relegated largely to non-pet vectors. The vaccination of ferrets for rabies (and canine distemper) could be made mandatory; public education and outreach could also be implemented. Provided that such

mitigation measures are incorporated into a legalization action, this potential impact upon human health could be reduced to a less-than significant level. This issue may not need to be analyzed further in the EIR.

Ferrets have a propensity to bite for various reasons. The frequency of ferret bites has not been demonstrated to be greater than the rates for dogs or cats, whose bite frequencies are considered to be acceptable risks that are outweighed by the benefits of their companionship. Serious ferret attacks appear to be rare and to be confined to infants and others who cannot defend themselves against a small animal. In most cases of serious attacks, the pet owners were not aware of the risks of leaving an unattended child near a ferret. Mitigation measures could include mandatory warning labels at points of sale, public outreach, and more radically, the ban of ferrets from homes with infants, elderly, or handicapped, and the euthanization of ferrets proven to cause serious injury. The CSUS questionnaire of health departments in the USA did not reveal any major opposition to ferret ownership; where agency personnel did comment, their concern focused on infants left unsupervised with ferrets. Provided that effective mitigation measures are incorporated into a legalization action, this potential impact upon human health and safety could be reduced to a less-than significant level. This issue may not need to be analyzed further in the EIR.



# 1. INTRODUCTION

The purpose of this study was first to summarize the body of knowledge on the domesticated European ferret as it pertains to its potential impacts upon the environment, and especially, native animals and ecosystems, agribusiness, and human health and safety. This study pertains specifically to the domesticated European pet ferret—*Mustela putorius furo* (hereafter, “ferret”), and not to its ancestors or conspecifics, the wild European polecat—*M. p. putorius* (hereafter, “polecat”) and steppe polecat—*M. eversmannii*, and the North American black-footed ferret—*M. nigripes*. Consistent with the current zoological vocabulary, the use of the word “ferret” in this study indicates the domesticated variety of *M. putorius* bred primarily as a human companion or laboratory subject; the word “feral” refers to a domesticated animal that has reverted to its wild, ancestral condition, particularly in behavior, and usually implying reproduction in the wild (but not necessarily indicating a self-sustaining population); and the word “wild” implies an undomesticated, free-ranging animal whose behavior and genome has not been intentionally altered or influenced by humans.

The intent of this study is to provide the California Fish and Game Commission with adequate and unbiased information about ferrets so that the California Fish and Game Commission can proceed with the preparation of an Environmental Impact Report, which is required by both the California Environmental Quality Act and a statement made by California Governor Arnold Schwarzenegger. An Environmental Impact Report is a necessary next step in the consideration by the California Fish and Game Commission of petitions by citizens to reclassify ferrets in the California Fish and Game Code from their current standing as wild animals/pests to pets exempt from regulation under the Code.

The goals of this study were to:

- dispel myths / misinformation
- adequately summarize the published literature
- update the state agency questionnaire performed by Jurek and Ryan (1999)
- summarize the management of the ferret by other governmental agencies in North America
- Identify issues for further analysis in the future Environmental Impact Report

# 2. HISTORY OF REGULATIONS AND POLICIES IN CALIFORNIA

Historical timeline of regulations and policies concerning ferrets in California are presented next. The unpublished *Chronology of Selected Ferret Issues, Version 2003* by Ron Jurek (CDFG) was incorporated into this timeline.

- Before 1933, the State of California apparently did not regulate ferrets.
- August 1933. Wild bird and animal importation law (Chapter 76, Statutes of 1933) was enacted [unlawful to import or transport, unless permitted by Fish and Game Commission].
- December 1933. “Rules and Regulations Governing the Importation of Wild Birds and Animals” were adopted by the Fish and Game Commission and Department of Food and Agriculture [Commission absolutely prohibits importation of ferret and fitch].
- September 11, 1957. From 1957 legislation, the Fish and Game Code section relating to restricted species was renumbered from Sec. 1165 to Sec. 2116, and the opening sentence was revised, as follows: "As used in this chapter, wild animal means any...(of listed groups)...which is either is not normally domesticated; in the State or not normally native to the State."
- In 1974, the Fish and Game Code entitled *The Importation and Transportation of Live Wild Animals* was amended to include almost all members of Mustelidae (Herman 2000). Kizer and Constantine (1989) give the reason for regulation as:

- “Ferrets also develop feral populations and are especially destructive of poultry and small wild animals such as rabbits, which was the reason why the keeping of ferrets as pets was outlawed in California.” (p. 466, Kizer and Constantine 1989).
- J. Hitchcock (of the California Department of Health Services) stated that the ferret has been banned since 1935 [sic] because of issues with wildlife, agriculture, and human health:

“The European ferret (*Mustela putorius*) has been a prohibited species in California since 1935. Of all the vertebrates covered in Section 671, Subsection (c), of Title 14, California Administrative Code, Importation, Transportation and Possession of Wild Animals; the European Ferret {*Mustela putorius*) is the ONLY animal of vital interest to all three California Departments involved with Title 14, Section 671, i.e., California Department of Food and Agriculture, California Department of Fish and Game, and the California Department of Health Services. The European ferret's predacious nature and wanton destruction of poultry, rabbits and other small livestock is well documented, as is its disastrous effects on game birds, waterfowl and other wildlife. However, the recent numerous and widespread reports of vicious unprovoked attacks on infants, including several deaths, has brought the public health aspects of the European ferret into extremely sharp focus. This coupled with the increasing reports of rabid European ferrets adds even greater public health importance to the species.” (p. 208, Hitchcock 1994)
- January 1, 1975. From 1974 legislation, Fish and Game Code Section 2116 was amended. A portion of the meaning of "wild animal" was revised, as follows: "...which either is not normally domesticated in this State or not normally native to this State as determined by the Commission." [the 1933 statute stated: "...which is either not normally domesticated, or not normally native within this State."]
- January 24, 1975. The opening sentence of Section 671. Title 14, CAC, was revised, as follows: "The following species of the families which are prohibited or for which a permit is required are determine to be not normally domesticated in the state and shall not be imported into, transported within; or possessed in this state, and permits for their entry..." Section 671.2, regarding Neutered Male Animals, was amended for allowing DFG to permit entry of neutered male animals not otherwise admissible, provided the application was accompanied by certification of neutering.
- 1976. The Commission adopted regulations that prohibited the issuance of permits for ferrets, except that permits could be issued for neutered male ferrets, for exhibition in zoos, for use in scientific or public health research by scientific institutions, and for public display or for exhibition in motion pictures and television.
- Late 1970s. Department of Food and Agriculture border check stations began detecting illegally imported ferrets.
- February 1, 1980. The number of requests received by the Commission to possess ferrets in California was increasing significantly. In testimony before the Commission, the Department reported that there were numerous un-neutered ferrets in the possession of people in California. Regulations provided for the importation of neutered male ferrets. However, there was no provision for importation of neutered female ferrets, so the Department was asked to develop a proposal to resolve the matter.
- March 7, 1980. The Department presented its proposal regarding importation and possession of female ferrets. The Commission approved the issuance by the Department of permits to possess female ferrets in California, if they were verified as having been acquired prior to Mar. 7, 1980 and as having been neutered and marked. Following a 60-day moratorium on arrests, future requests for importation or possession of female ferrets would be denied. Also, the Commission denied a request for permits to import ferrets for sale.
- July 12, 1982. Department law enforcement reported that a significant increase was noted in numbers of ferrets intercepted at Agricultural Inspection Station. Also, numbers of people found to be illegally breeding ferrets in California was increasing. Two wardens were assaulted in a case involving illegal ferret breeding.

- July 12, 1982. The Department of Fish and Game established policy to deny issuance of permits to California residents to import and possess neutered males of prohibited animals, including ferrets. Such permits would be issued only to persons moving to California who already possessed such pets. This policy was made at the request of the California Department of Food and Agriculture.
- September 30, 1985. Department of Food and Agriculture position letter recommended “*No change in present regulations*” restricting ferrets.
- October 4, 1985. Department of Health Services' position letter requesting “*Don't relax or eliminate present restriction on ferrets.*”
- October 11, 1985. The Department informed the Commission of position statements by Department of Fish and Game, Department of Food and Agriculture, and Department of Health Services to continue restrictions on ferrets.
- November 1, 1985. The Commission approved a request for possession of two neutered female ferrets. Also, the Commission requested an in-depth analysis of potential problems associated with Commission authorization of ferrets for pet purposes.
- There was apparently a policy shift in 1986—1987 by CDFG:  
    “Until 1987, sterilized male ferrets could be imported and possessed as pets, under DFG permit.” (page 1 of Appendix B-1, Jurek and Ryan 1999)
- 1986. Beginning of intensive ferret legalization efforts in California by pro-ferret groups.
- February 2, 1986. The Department provided the requested analysis of potential problems associated with Commission authorization of ferrets for pet purposes.
- March 7, 1986. The Commission voted to uphold regulations restricting ferrets and supported strict enforcement.
- July 15, 1986. The Department announced its policy to deny all requests for permits for neutered male ferrets pending Commission consideration of a proposal to repeal 671.2, Title 14, California Administrative Code.
- October 7, 1986. Pre-publication of Notice to prohibit the importation and possession of neutered male animals not otherwise admissible.
- According to P. Weisser, an Information Officer for CDFG, amnesty was given to some ferrets in 1986 when the Commission adopted a new policy regarding ferrets:  
    “Under a policy adopted in 1986 by the Fish and Game Commission, neutered male ferrets were made illegal as pets in California, except for those which were already pets at that time. Their owners were granted permits to keep the ‘grandfathered’ pet ferrets, but no new pet ferrets could be acquired in or brought into California.” (p. 6, Weisser 1991)  
  
    “The [California Domestic Ferret] association plans to seek legislation to legalize ferret pet ownership in California. According to Phillips, the idea is to seek creation of a permit to keep a ferret pet in California. The permit would be good for a three-year period and cost \$50 for each pet ferret. Phillips stresses that, under the legislative proposal contemplated by the California Domestic Ferret Association, all pet ferrets would be required to be spayed or neutered. A separate permit would be required for ferret breeders and the cost of the permit would be several times that of a pet owner’s permit. Assuming that 500,000 ferret pets already exist in California, such legislation could generate as much as a \$5.5 million chunk of ferret-generated revenue for DFG’s tight budget in an era of very limited state fiscal resources, Phillips suggested. Would this volume of revenue lead DFG policy makers and lawmakers to take a new and more sympathetic look at legalizing ferrets as pets? DFG enforcement officials say the existing ferret policy is sound and should not be influenced by a

revenue argument. They say the \$50 permit fee contemplated would not cover the cost of inspecting facilities, responding to escaped ferrets and issuing permits. They also question why ferrets should be treated differently than other pet wild animals.” (p. 9, Weisser 1991)

- January 1987. The Commission directed the Department to discontinue issuing permits to possess prohibited species for pet purposes, except for those who legally possessed such animals in California at that time.
- May 15, 1987. The Commission voted to repeal Section 671.2, Title 14, California Administrative Code, thereby prohibiting the importation, transportation, and possession of neutered males of restricted animals listed in Sec. 671, including ferrets
- February 10, 1988. Superior Court of California for San Diego County—*Gross v. State*—ruled as a matter of law that section 2116 and 2118 of the Fish and Game Code and Section 671 of the California Administrative Code are constitutional and can be applied to restrict domestic ferrets.
- October 1988. Subsections (a) and (b) of Section 671, Title 14, were added: "(a) It shall be unlawful to import, transport, or possess alive animals restricted in subsection (c) below ..." and "(b) The commission has determined the below listed animals are not normally domesticated in this state." These and additional verbiage replaced "The following species of the families which are prohibited or for which a permit is required are determine to be not normally domesticated in the state and..." The list continued to include the Family Mustelidae (all species).
- December 1988. Department of Health Services published an assessment of the hazard posed by ferrets to public health, small livestock, and wildlife. Information was obtained on 452 ferret attacks on people during 1978-1987, one hundred of which were in California.
- 1989. California Domestic Ferret Association lead ferret legalization efforts in the state (1989-1996).
- March 1989. The Department in southern California seized 36 illegally owned ferrets from six people, including two founders of the Southern California Ferret Association, who were suspected of trafficking and commercial breeding of prohibited wildlife. The following magazine article summarizes other enforcement actions in this year:  
“During 1988-89, 150 ferrets were taken from their owners at state borders by the pest exclusion division of the State Department of Food and Agriculture. ‘They’re one of the easiest animals to detect because they smell so bad—all you have to do is stick your nose into the car window,’ says Fish and Game’s Rich Barbour.” (p. 27, Gustaitis and McGrath 1992)
- 1992. *California Domestic Ferret Association v. California Fish and Game Commission, et al.*
- 1993. Department of Fish and Game wardens in 1993 issued approximately 50 citations for possession of illegal ferrets, and approximately 60 ferrets were confiscated.
- January 1994. Assembly Bill 2497 (Goldsmith) was introduced to provide for legalization of ferrets. [failed passage 4/94]
- Former Assemblyman Jan Goldsmith, R-Poway, supported an amnesty measure in 1994 (Assembly Bill No. 2497):  
“Ferrets are also ingrained in state Capitol lore. Former Assemblyman Jan Goldsmith, R-Poway, drew a rousing rejoinder from former Assembly Speaker Willie Brown as he pitched a ferret amnesty measure in 1994. ‘That bill is deadlier than that thing on your head,’ quipped Brown, referring to Goldsmith's hairpiece.” (Gardner 2004)
- Hitchcock (1994) described the same measure as follows:  
“In light of a recent California Legislature Assembly Bill (AB No. 2497) ‘Wild animals: domestic ferrets’ introduced by Assembly Member Goldsmith (coauthor Senator Kopp) on January 11, 1994; both the approach



and content of this presentation has been modified to meet a more urgent and critical need (Goldsmith and Kopp 1994). AB No. 2497 would allow ‘domestic’ ferrets ‘to be owned as pets without a permit as long as the owner of a ferret maintains, and can produce documentation showing that the ferret has been vaccinated against rabies with a vaccine approved for use in ferrets by the United States Department of Agriculture and administered in accordance with the recommendations of the vaccine manufacturer.’ The bill would amend Section 2118 of the Fish and Game Code in two locations: 1) under Order Carnivora ‘All species, [prohibited] except domestic dogs (*Canis familiaris*) and domestic cats (*Felis catus*)’ would be amended to strike the ‘and’ between dogs and cats and following (*Felis catus*) to add ‘, and domestic ferrets (*Mustela furo*) to be owned as pets, as long as the owner ...’ as in the paragraph above; and 2) following the listing of mammalian orders in the final paragraph ‘Mammals of the orders Primates, Edentata ... are restricted for the welfare of the animals, except for the families Viverridae and Mustelidae in the order Carnivora are restricted because such animals are undesirable and a menace to native wildlife, the agricultural interests of the state, or to the public health or safety’ would be amended to add between animals and are undesirable ‘, not including domestic ferrets to be owned as pets,’. The European ferret is obviously a member of the Family Mustelidae! The bill would also amend Section 25990.3 [sic] of the Health and Safety Code which is currently a single, simple and easily interpreted paragraph. ‘25990.3. The state department shall publish from time to time a list of animals which may not be imported into this state except by permit from the state department. Unless such a permit is issued pursuant to the provisions of this chapter, it is unlawful to import into this state any wild animal for which a permit is required by the state department.’ The amended Section 25990.3 would add a second paragraph: ‘A permit shall not be required to import into this state domestic ferrets to be owned as pets, as long as the owner of a ferret maintains ... of the vaccine manufacturer’ as AB No. 2497 above. There are also two minor changes in the original paragraph, the ‘which’ after ‘list of animals’ is changed to ‘that’ and ‘the provisions of’ is deleted.”

- December 1994. Senate Bill SB 55 (Kopp), nearly identical to AB 2497, was introduced [failed passage 1/96]
- August 3, 1995. Presentation to the Commission by California Domestic Ferret Association requesting legalization of ferrets as pets
- November 2, 1995. Presentation to the Commission by California Domestic Ferret Association requesting legalization of ferrets as pets.
- Jurek and Ryan (1999) summarized an attempt in 1995 by the pro-ferret organization California Domestic Ferret Association to get the Commission to reclassify ferrets:

“In 1995, the California Domestic Ferret Association publicly requested that the Commission remove the domestic ferret from the list of restricted ‘wild animals’ under Title 14, Section 671. At their November 2, 1995 meeting, the Commission voted to submit a notice of proposed regulatory action to the Office of Administrative Law to consider removing the ferret from that list. That regulatory process was to be initiated after a draft environmental document had been completed for public review. The Department of Fish and Game (Department) was asked by the Commission to prepare an environmental document. The Department responded at that time that the earliest staff could begin work on such a document would be in spring 1996. The Department’s Wildlife Management Division reassigned endangered species staff time to this undertaking in May 1996. To establish the scope of the document, the Department focused on two main areas of information gathering. The first was a bibliographic search. The Department contracted with the University of California at Davis to conduct an extensive literature search of libraries, Internet sources, and other information sources. That bibliography was published as an administrative report in 1997 (Whisson and Moore, 1997). The other part of the scoping process entailed canvassing each state for pertinent information on their laws and regulations and on the status of the ferret. The goal was to determine the concerns of each state wildlife agency and to clarify what authority and role each state wildlife agency had regarding ferrets. Such information would be useful to the Department for preparing the environmental document for the Commission. A questionnaire was developed for this survey. In October 1996, the Wildlife Management Division of California Department of Fish and Game mailed the questionnaire to each state wildlife agency in

the nation. Meanwhile, the Office of the Attorney General had been conducting a legal analysis of the Commission's power to designate "wild animals" and limitations, if any, of adopted regulations. In November 1996, the State Deputy Attorney General informed the Commission that, in his opinion, the Commission did not have the authority to adopt regulations to remove restrictions on ferrets, so legalization of ferrets was a legislative matter. On November 8, 1996, the Commission accepted that decision and proposed to work with the California Legislature on legislation to provide guidance and clarification to the Commission. Therefore, with no pending Commission action, there was no longer a need for the environmental document. However, the nationwide survey information would be useful if future legislation or Commission actions include requirements for environmental documentation." (pp. 1-2, Jurek and Ryan 1999)

- The results of this nationwide survey were published in Jurek and Ryan (1999).
- November 2, 1995. The Commission voted to submit a notice of proposed regulatory action to consider removing the ferret from the list of prohibited species. The associated regulatory process would be initiated only after a draft environmental document were completed for public review.
- May 1996. H.R. 37 (Goldsmith) - House resolution "...Resolved, that the Fish and Game Commission should remove the domestic ferret from its list of unlawful wild animals and should no longer prohibit ownership or possession.."
- October 1996. Californians for Ferret Legalization formed to lead ferret legalization efforts in the state. until 2003.
- October 1996. The Department mailed a survey questionnaire to each state wildlife agency in the nation to obtain legal and natural history information regarding domestic ferrets. (Published August 1999)
- November 8, 1996. The State Deputy Attorney General informed the Commission that, in his opinion, the Commission did not have the authority to adopt regulations to remove restrictions on ferrets, so legalization of ferrets was a legislative matter. The Commission accepted that decision and proposed to work with the California Legislature on legislation to provide guidance and clarification to the Commission.
- December 1996. *Marshall Farms v. Commission*: Marshall Farms, New York, the largest ferret breeding facility in the U.S., sued the Fish and Game Commission on grounds that it had failed to fulfill its mandated statutory duty to reclassify the ferret. The Commission appealed an unfavorable finding in that case.
- January 1997. Pat Wright, leader of Ferrets Anonymous, was the defendant in a case brought by the City of San Diego against him in 1996 for attempting to conceal from health officials a ferret that had bitten a child (*People v. Wright*). The City prevailed. Mr. Wright used the case to challenge the constitutionality of Fish and Game Code Section 2118 (B), with regard to the inclusion of ferrets as a Wild Animal. On April 30, 1997 his constitutional challenge was rejected.
- February 1997. AB 409 (Machado) was introduced to give the Fish and Game Commission, with cooperating state agencies, sole authority to regulate the importation, transportation and possession of all "restricted" animals, including the ferret.
- February 1997. AB 363 (Goldsmith) was introduced to legalize ferrets. Failed passage in Senate Appropriations Committee in 1998.
- January 9, 1998. *Marshall Farms v. Commission*: The Superior Court granted the writ of mandate. Commission filed an appeal to the Superior Court judgment.
- July 1998. AB 409 failed passage.
- February 1999. Assembly Bill AB 854 (Cunneen) was introduced to legalize ferrets already possessed in California.



## Senate Office of Floor Analysis:

## AB 854 (Cunneen-R) Wild animals: domestic ferrets

Provides that any person who owns a domestic ferret on April 20, 1999, shall be deemed to own the ferret legally after January 1, 2000, if the owner, on or before July 1, 2000, is able to produce documentation showing that the ferret has been vaccinated against rabies and if the ferret is spayed or neutered. Requires the State Department of Fish and Game to conduct a study for submission to the Legislature and the Fish and Game Commission before April 1, 2001 to determine the current and potential impacts, if any, of ferrets on the environment, native wildlife, agriculture, and public health and safety, relative to other domesticated animals. Based on the report and other relevant information, requires the commission to make a determination whether to remove the ferret from the list of prohibited species. Authorizes a county to adopt an ordinance that provides for licensing requirements, enforcement methods, and other regulatory measures. (Died in Senate Appropriations Committee)

- Herman (2000) summarized the intent of Assembly Bill 854 as follows:

“On February 24, 1999, California Assemblyman Jim Cunneen (R-San Jose) introduced Assembly Bill 854 (hereinafter AB 854), the latest legislative proposal to legalize possession of ferrets in California. AB 854 passed the Assembly on May 27, 1999, by a vote of seventy-three to nine, and, as of October 1999, was pending in the California Senate Appropriations Committee. AB 854 is not a full-legalization statute, but rather an amnesty for ferrets. This bill, which is tentatively designated as Fish and Game Code sections 2220 and 2221, would allow legal possession of ferrets present in California as of April 20, 1999, provided that their owners can produce documentation of rabies vaccination (with a USDA-approved vaccine) and spaying or neutering. The CDFG, CDHS, and the California Department of Food and Agriculture would be required to conduct a study to determine current and potential impacts of ferrets on California's environment, native wildlife, agriculture, and public health and safety. CDFG would then have to present the results to the Legislature and the Fish and Game Commission by April 1, 2001. The Legislature and Commission would then determine whether to remove the ferret from Fish and Game Code section 2118's list of prohibited wild animals. If AB 854 were enacted, it would be possible that ferrets currently owned in California might be safe from confiscation, but could not be replaced through importation if the section 2118 ban on importation remained in force. Therefore AB 854 is a half-measure at best, and can only be seen as a provisional measure to be taken before any legalization of ferret ownership and reclassification of ferrets as domestic animals could occur. Yet even this limited amnesty is under attack; a staff recommendation to the California Senate Appropriations Committee suggested that the amnesty program be deleted entirely, and that AB 854 should be limited to the CDFG study before any legalization of ferrets, no matter how narrow in scope, could occur. Nevertheless, AB 854's use of a study to determine detrimental effects, in conjunction with an amnesty, would be more beneficial to ferret owners and the state of California than a study without amnesty. A 1997 report analyzing a legislative proposal similar to AB 854 noted that ‘this option would provide at least some assurance that impacts would be studied properly...while enabling ferret owners to have their pets vaccinated, spayed or neutered, and provided with other necessary and appropriate veterinary care.’ Thus AB 854, although suffering from some flaws, would still be an improvement to the status quo.” (p. 50, Herman 2000)
- September 1999. *Marshall Farms v. Commission*: The Appellate Court opinion rendered.
- February 3, 2000. Presentation to the Commission by Californians for Ferret Legalization that the Commission consider removing ferrets from the restricted species list. The hearing was continued to April 6, 2000
- April 6, 2000. The California Fish and Game Commission, As explained at the meeting, a regulatory action by the Commission is considered a project under the California Environmental Quality Act, which requires the preparation of an environmental document. Therefore, at the conclusion of public testimony, the Commission directed the Californians for Ferret Legalization, as project proponents, to fund the preparation of the environmental document to assess the potential impact to the environment of this proposed action. The Commission would not be in a position to again consider this matter until such environmental document were prepared.

- 2001. SB 1093 (Johannessen *et al.*) This bill would give amnesty to ferrets that were in California as of May 1, 2001, and if they were spayed, neutered and vaccinated. It required a study of possible impacts of ferrets on wildlife and people. The final version of the bill would have appropriated \$250,000 from the General Fund to pay for an Environmental Impact Report. The bill lacked sufficient support to pass (August 2002).
- In 2001, Pat Wright (of San Diego Ferrets Anonymous), filed a lawsuit (Pat Wright vs. California Fish and Game Commission) against the California Fish and Game Commission over their April 6th decision. Back in April the Commission said they would not discuss ferret legalization further until ferret proponents paid for another study on the environmental impact of ferret legalization.
- June 2001 – court granted the Department of Fish and Game's request for summary judgment to throw out lawsuit. CDFG's motion for summary judgment for declaratory relief over the ferret ban was rejected. Judgment was entered against Appellant on July 1, 2002. The Notice of Appeal from the Judgment was filed by Appellants on August 16, 2002, appealing from the final judgment and order after final judgment. In January 2003, Wright's appeal was denied.
- September 10, 2002. AB 3055 signed into law, allowing California veterinarians and their employees to legally treat ferrets. It excludes veterinary facilities boarding ferrets if no veterinary care is required. Golden State Ferret Society summarizes:
  - "Prior to 1995, licensed veterinarians in the State of California were required by law to report to the Department of Fish & Game the names of any clients who brought a ferret into their clinic. Eventually the legislature acknowledged that veterinarians should not be liable to perform law enforcement duties and overturned the law... In the early 2000s a bill was passed making legal for vets to care for ferrets without fear of repercussions." (Golden State Ferret Society website, <http://www.goldenstateferretsociety.org/pdfs/2008ferretvetlist.pdf>)
- The following is an excerpt of the resulting law that went into effect in 2002:

"Section 4826.2 is added to the Business and Professions Code, to read:  
4826.2. Notwithstanding any other provision of law, a veterinarian, registered veterinary technician, or an unregistered assistant working under the supervision of a veterinarian, may provide veterinary care and treatment for any animal restricted pursuant to Section 2118 of the Fish and Game Code. A veterinarian, registered veterinary technician, or an unregistered assistant working under the supervision of a veterinarian, may lawfully possess one or more of the animals only for the period of time that, in his or her judgment, veterinary care and treatment are necessary. No veterinarian, registered veterinary technician, or unregistered assistant working under the supervision of a veterinarian, has a duty to advise law enforcement if he or she becomes aware that one or more of the animals is possessed in the state. For the purposes of this section, 'veterinary care and treatment' does not include boarding when no veterinary care or treatment is required." (Legislation query at <http://www.senate.ca.gov/>)
- January 27, 2003. SB 89 (Alpert) introduced. This bill would have established amnesty for ferrets in the state and would have required the Department to undertake a ferret-permitting program to collect fees to fund the preparation of an Environmental Impact Report. In July 2003, the author idled the bill, and it could possibly be taken up again in 2004.
- In 2004, Senate Bill 89, sponsored by Senator Dede Alpert (D-San Diego), would have granted amnesty under limited conditions to ferrets already in California; it was vetoed by Governor Arnold Schwarzenegger on 29 Sept. 2004. Gardner (2004) gives the following details:
  - "The legislation, SB 89 by Sen. Dede Alpert, D-San Diego, would have granted amnesty under limited conditions to ferrets already in California. A \$75 license fee would have been dedicated to a study of whether ferrets pose any danger... Under Alpert's bill, ferret owners would have paid \$75 to register their pets. Of that, \$50 would have gone toward funding an environmental impact report to determine whether ferrets are dangerous or should be treated like any other pet. The measure also would have required vaccinations, and

spaying or neutering. The amnesty period would have closed July 31....‘I love ferrets. I co-starred with a ferret in ‘Kindergarten Cop,’ Schwarzenegger insisted in his veto message. ‘However, this bill is too bureaucratic and it legalizes ferrets prior to conducting an environmental impact report.’ ” (excerpts from Gardner 2004)

- In 2005, California Fish and Game Commission adopted the following policy for the introduction of non-native species into California:

“MISCELLANEOUS POLICIES

INTRODUCTION OF NON-NATIVE SPECIES

It is the policy of the Fish and Game Commission that:

Proposals to introduce exotic species shall be submitted to the Commission for approval. The Department will review and evaluate proposals to insure that the potential effects of such introductions will not have unacceptable negative impacts on native species, agriculture interests, and public health and safety.

In considering proposed introductions, the Commission and Department will be guided by the following:

Introduction of exotic species will be authorized only after potential impacts have been carefully evaluated and it has been demonstrated that such impacts will be negligible or positive. Such an evaluation will consider the species' ability to disperse outside the introduction area.

Initial experimental introduction of an approved exotic species will be made under conditions that will permit the action to be reversed, such as introduction into a confined area or introduction of sterile individuals.

Benefits of the action will be described, including why the need cannot be satisfied through improved management to enhance native species or previously established non-native species.

Introduction of previously established non-native species into areas of the state where they have not been established will be permitted only after it has been determined by the Department that they will have no significant negative impacts.

Introduction of previously established non-native animal species shall be done in a manner consistent with Section 671.6 of Title 14.

Stocking of “fish” into the waters of the State shall be done in a manner consistent with Section 238.5 of Title 14.

Definitions:

A non-native species is any of mammal, bird, fish, amphibian, reptile, invertebrate, or plant that is not native to California. A previously established non-native species is an animal or plant that has become established in California by the aid of humans.

Amended: 06/23/05”

(Available on the Internet at: <http://www.fgc.ca.gov/policy/p4misc.asp#INTRODUCTION>)

- Other recent attempts by pro-ferret organizations to get the California State government to reassess the ferret legalization issue include the following:

“In an open letter to Secretary of Agriculture A.G. Kawamura, dated June 2nd, 2007, the non-profit organization, LegalizeFerrets.org, part of the San Diego chapter of Ferrets Anonymous, requested a formal re-evaluation of the statewide ban on domestic ferrets (Mustelo [sic] putorius furo). ‘The ban on ferrets as pets in California is has been justified on a single, 18-year-old study, for which no background information is available,’ says Pat Wright, founder of Ferrets Anonymous and LegalizeFerrets.org. ‘The study is outdated and flawed. Since no one at the agriculture department or the Department of Fish and Game can give us any scientific reasons why domestic ferrets threaten agriculture or the environment, we feel the ban should be overturned.’ Wright characterizes his open letter to the California Department of Food and Agriculture (CDFA), the agency responsible for commissioning the 1989 study, as an invitation to examine the issue more closely, in the name of responsible government.” (Tone 2007).

“According to LegalizeFerrets.org, California ferret owners are upset that the head of the California Department of Food and Agriculture, the Honorable A.G. Kawamura has ignored a formal request and letter writing campaign to get the CDFA to reevaluate their position that ferrets pose a threat to the state's agricultural industries... In 1992 the CDFA commissioned a study by Kenneth Smallwood titled A Rating System for Potential Exotic Bird and Mammal Pests which listed the domestic ferret as highly likely to go

feral, and once feral difficult to eradicate. The problem with the study is the variables plugged into their matrix were subjective. The study starts with the conclusion and works backward. And 25 years later, despite California having more pet ferrets than any other state - (according to the Pet Industry Joint Advisory Council, the nation's leading pet industry lobby) not one ferret has ever damaged anything related to agriculture in the state of California. On June 2nd this year a registered letter was sent to Mr Kawamura by LegalizeFerrets.org founder Pat Wright asking: to request a formal re-evaluation of the ban on domestic ferrets (*Mustela putorius furo*) in this state. As the lead agency regarding information and information dissemination on the domestic ferret, the California Department of Food and Agriculture (CDFA) has a responsibility to all Californians to either justify the ban with specific scientific information or publicly declare that CDFA does not oppose ferret legalization. No response was received. LegalizeFerrets.org then conducted a letter writing campaign. We know of hundreds of letters went to Mr. Kawamura and no one received a response.” (Zander 2007)

Currently, under Fish and Game Code §§12000, 12002, it is unlawful to import or possess certain wild animals in California; possession of wild animal specified by Fish and Game Code §2118 is a misdemeanor, punishable by imprisonment and/or a monetary fine. The animal must be destroyed or removed from California within 72 hours, at the owner’s cost (Fish and Game Code §§2122, 2189). The authority to decide which animals are classified as “wild animals” resides with the Commission, according to Fish and Game Code §2116:

“§2116. Wild Animal

As used in this chapter, ‘wild animal’ means any animal of the class Aves (birds), class Mammalia (mammals), class Amphibia (frogs, toads, salamanders), class Osteichthyes [sic] (bony fishes), class Monorhina (lampreys), class Reptilia (reptiles), class Crustacea (crayfish), or class Gastropoda (slugs, snails) which is not normally domesticated in this state as determined by the commission.”

Fish and Game Code §2118 makes the ferret illegal to import or possess by virtue of not excluding it from the list, as is done for domestic dogs and cats:

“§2118. Unlawful To Import, Etc. Specified Animals; Exceptions

It is unlawful to import, transport, possess, or release alive into this state, except under a revocable, nontransferable permit as provided in this chapter and the regulations pertaining thereto, any wild animal of the following species:

(b) Class Mammalia

Order Carnivora (carnivores) All species, except domestic dogs (*Canis familiaris*) and domestic cats (*Felis catus*).”

A permit system is already in place to allow the importation and possession of restricted species—Fish and Game Code §671.1. Permits for Restricted Species. The application form is “2009 Restricted Species Application (FG1312)”. However, the CDG current policy appears to be that no permits will be issued for ferrets (unless perhaps for scientific research).

Fish and Game Code §671 specifically lists the ferret in a list of restricted animals, making it illegal to import or possess ferrets in California, and designated them as “detrimental”:

“§671. Importation, Transportation and Possession of Live Restricted Animals.

(a) It shall be unlawful to import, transport, or possess live animals restricted in subsection (c) below except under permit issued by the Department of Fish and Game.

(b) The commission has determined the below listed animals are not normally domesticated in this state.... Those species listed because they pose a threat to native wildlife, the agriculture interests of the state or to public health or safety are termed “detrimental animals” and are designated by the letter “D”.

(2) Class Mammalia-Mammals

(K) Order Carnivora-Raccoons, Ringtailed Cats, Kinkajous, Coatis, Cacomistles, Weasels, Ferrets, Skunks, Polecats, Stoats, Mongoose, Civets, Wolves, Foxes, Coyotes, Lions, Tigers, Ocelots, Bobcats, Servals, Leopards, Jaguars, Cheetahs, Bears, etc.

5. Family Mustelidae - All species (D), except:



- a. *Ambloynx cinerea* (Oriental small-clawed otter) (W).
- b. *Aonyx capensis* (African clawless otter) (W).
- c. *Pteronura brasiliensis* (Giant otter) (W).
- d. All species of Genus *Lutra* (River otters) (W)."

The California Department of Public Health (CDPH) has the power to regulate ferret importation in California, but apparently does not currently consider the ferret a wild animal and does not prohibit importation. Provided here are excerpts of the Health and Safety Code §§121775-121845:

“§121775. As used in this chapter, "wild animal" refers to any animal of the class Aves (birds) or class Mammalia (mammals) that either is not normally domesticated in this state or not native to this state.

§121790. The department shall publish from time to time a list of animals that may not be imported into this state except by permit from the department. Unless a permit is issued pursuant to this chapter, it is unlawful to import into this state any wild animal for which a permit is required by the department.

§121795. The department may adopt regulations governing the entry, quarantine, or release from quarantine, of any and all wild animals imported into this state pursuant to this chapter. The regulations shall be designed to protect the public health against diseases known to occur in any such animals.

§121800. The violation of any provision of this chapter shall be a misdemeanor.

§121825. The department may issue a written permit to import into this state any wild animal specified by the department pursuant to Section 121790, upon determination that the public health and safety will not be endangered by the importation in accordance with the terms and conditions of the permit.”

Section 30072 of the Health and Safety Code provides the aforementioned list of wildlife requiring a permit to import:

“§30072. Wildlife Admitted by Permit. No person shall import into or receive in this State any animals of the following orders, families, and genera specified herein without first obtaining a permit and paying to the Department such fees as required under these regulations.

§30072(b)(2)(d)

Family Mustelidae [sic], genus *Mephitis* (Striped-Skunk and genus *Spilogale* (Spotted Skunk).

All other members of the family Mustelidae [sic] are admissible without permit from the Department.”

The CDPH website states the administration of these codes:

“Wild Animal Importation. Importers of specified carnivores and non-human primates into California are required to obtain a wild animal importation permit from the Veterinary Public Health Section (VPHS) prior to entry under authority of California Health and Safety Code sections 121775-121870 and California Code of Regulations, Title 17, sections 30070-30086. Additional restricted species permits may also be required by the California Department of Fish and Game.

Imported animals are mandated to be quarantined in approved facilities and be tested for certain infectious diseases prior to release of quarantine. Please refer to the wild animal importation laws and regulations for information about which animals require an importation permit and about the quarantine facility requirements. Applications for importation permits can be obtained by contacting VPHS.”  
(<http://www.cdph.ca.gov/programs/vphs/Pages/WildAnimalImportation.aspx>)

There is apparently only selective enforcement of violations of the Fish and Game Code regarding ferret importation and possession. Published examples include:

“Go ahead and snicker, but know that for many, the contraband status of ferrets is no laughing matter. If forced to choose, plenty of people would take their pets over their U.S. senators-they actually know their pets' names, they cost less to keep alive, and they perform their tricks closer to home. And know that as you chuckle, agricultural

agents on the state's borders are peering into cars looking for furry fellows. If spotted, the cars will be turned away. In an extreme case in 1995, a young man headed for summer school in California wound up in jail for attempting to bring his pet along. (His four-day sentence was cut down to a single day, when his jailers could no longer keep a straight face.)” (Lynch 2001)

“Enforcement of California’s ferret exclusion rule is necessary. And while the ferret industry claims that hundreds of thousands of ferrets are already in California illegally, that claim has not been verified, although there is evidence that efforts to import ferrets into California have increased greatly in the past few years. Ferret interceptions at agricultural inspection stations increased steadily from none in fiscal year 1975-76 to 210 in 1985-86 (California Department of Food and Agriculture, 1987). Greater surveillance and enforcement efforts in this regard may be needed.” (pp. 38-39, Constantine and Kizer 1988)

“...Department of Food and Agriculture border check stations began detecting illegally imported ferrets in 1976. By the late 1980s, statewide interceptions of vehicles containing ferrets had reached 150-300 vehicles per year (Calif. Dep. Food and Agric. records).” (p. 1, Jurek 1993)

“SAN DIEGO (AP) -- Ferret lovers say there may be 500,000 of the cute, weasel-like pets in California. And all of their owners are breaking the law... Owning a ferret, a misdemeanor, can carry a \$1,000 fine and up to a year in jail. Ferret lovers say the law is rarely enforced.” Associated Press. 1998. Ferret Rally in San Diego. Printed January 11, 1998

Current policy of the State of California is apparently to allow ferret-related products to be sold in pet stores without repercussion or penalty to the store owners, and without requiring these store owners to report the illegal possession of a ferret. The State of California also apparently tolerates the convening of ferret conferences and the posting of pro-ferret content on the Internet. Some pro-ferret organizations claim that all of these sources (veterinary visits, pet stores, pro-ferret conferences and correspondence) provide the State of California, and particularly CDFG game wardens, with ample information to persecute ferret owners and rudely enforce current anti-ferret regulations. The details of the enforcement of current anti-ferret regulations was not investigated in this study.

On 4 May 2009, Dr. Graening spoke with Counselor David Kiene (CDFG’s Office of General Counsel); Mr. Kiene stated that the decision to remove an animal from the Section 671 list resided with the Fish and Game Commission, but that DFG would probably supply the scientific information to assist with that decision. David Kiene referred me to the Commission and specifically, to John Fisher.

On 5 May 2009, Jon K. Fischer (Deputy Executive Director-Regulations and Policy) spoke with Dr. Graening at length about the process to get the Commission to review the ferret’s status on Section 671 list. First, Mr. Fisher stated that the Commission’s position remained the same since the issue was brought up at the April 2000 meeting; that is, that an Environmental Impact Report (EIR) would need to be prepared before the Commission would make a decision on the ferret’s status. Mr. Fisher stated that it was doubtful that the State would, or could, pay for such a report. Mr. Fisher pointed Dr. Graening to the Commission’s policy on Non-native Animals, and stated that the Commission’s policy was to make a decision based upon scientific evidence that the action (in this case allowing the importation and possession of ferrets) would have a neutral or beneficial impact upon the environment.

Dr. Graening proposed that CDFG’s previous study be updated (Jurek and Ryan 1999). To remain unbiased, such a study could be performed by an academic institution and published in a peer-reviewed journal such as the Journal of Mammalogy. Mr. Fisher was enthusiastic about such an academic study, and stated that he thought that such a study would provide the information from which the Commission could make a decision. He did predict, however, that the results of such a study might not support the cause of ferret legalization.

Mr. Fisher did confirm that the decision to consider removing the ferret from the Restricted Animals list was a rulemaking action, and as such, would trigger the need for compliance with the California Environmental Quality Act; this is consistent with the Commission’s prior insistence on the preparation of an EIR, as well as the statements made by the



Governor in 2004. Mr. Fisher did confirm that the Commission would probably be the Lead Agency (CDFG is the only other possible choice). Once the Final EIR was adopted and the Notice of Determination filed, the issue would be brought before the Commission for a vote. Mr. Fisher notified CDFG executive officers Sonke Mastrup and Dr. Eric Loft of the pending CSUS ferret impact study; Dr. Loft delegated the review of the ferret impact study to Dale Steele (Non-game Program). Quarterly progress reports have been mailed to Mr. Steele.

### **3. REGULATION OF FERRETS OUTSIDE OF CALIFORNIA**

#### **3.1. REGULATORY CLASSIFICATION**

In the last 3 decades, the regulatory classification of ferrets was an important issue because the regulatory authority of some state agencies depended upon whether the animal was classified as wildlife/exotic animal or a domesticated animal/pet. Herman (2000) summarized the issue as follows:

“A major split among the states concerns whether ferrets are considered wild or domestic animals. This status is of critical significance for tort liability: generally, an owner of wild animals is strictly liable for all the injuries they caused. On the other hand, owners of domestic animals, in the absence of statutes to the contrary, are strictly liable only for animals known to have a vicious disposition, and for farm animals (including horses, cattle, swine, goats, and chickens) that have trespassed onto others’ lands. Several states’ legislatures have explicitly defined ferrets as domestic animals, while others have classified ferrets as wild animals. Some states’ courts have placed ferrets in the ‘wild’ category through judicial decisions. (p. 39, Herman 2000)

In Jurek and Ryan (1999)’s questionnaire, there was no consensus as to classifications:

“Classification. State wildlife agencies use a variety of terms to classify ferrets under their regulations. Some states use more than one of the classifications described here. Five states reported that they used no such specific classifications. The most common classifications were ‘domestic animal; and ‘exotic’, which were used alone or in combination with other classifications. Twenty-five (50%) of the states classified the ferret as a ‘domestic animal’; five of those states classified them as ‘exotic’, as well. Sixteen states (32%) classified them as ‘exotic’; five of these states also classified them as both ‘exotic’ and ‘domestic animal’, and two classified them as ‘exotic’ together with other classifications, including ‘prohibited’ and ‘nongame’ (Appendix B-5). Only one or two states each classify ferrets as ‘nongame’, ‘furbearer’, ‘wild animal’, ‘restricted’, ‘non-protected’, or other special designation.” (p. 8, Jurek and Ryan 1999)

In our CSUS questionnaire, the results were slightly different:

“Which of these terms are used in your State to classify domesticated ferrets under any regulations or codes?”

Many respondents indicated that multiple classifications were used in their State.

‘pet’ or ‘domestic animal’ = AK, AL, AZ, CO, CT, CT, DE, DE, GA, IA, IA, ID, IN, KS, KY(2), LA, MD, ME, MT, ND, NE, NM, OK, OR, PA, RI, SC, SD, TN, VT, WA, WA, WA, WI

‘restricted animal’ = California, and Hawai’i (“since 1905”)

‘wildlife’ or ‘wild animal’ = AR, GA, IL, MN, NB, NS, NV, VI, WY,

‘exotic animal’ = DC, NJ, TN, VI, WA, WI(2)

‘nuisance animal’ = WI

indicated no classification = OH, OK, MN, NH, WV

The rest of the respondents did not respond to this survey question.

Thus, since the Jurek and Ryan (1999) survey, there has been a slight increase in the number of States (25 to 29) that classify the ferret as a domestic animal and/or pet. Note that the classification of ferrets in a State is typically consistent with its regulatory status in that State. Those agencies that regulate the ferret as a pet, or do not regulate ferrets at all, tend to classify the ferret as a domestic animal and/or pet. Those agencies that regulate the ferret as a non-domestic animal or as a non-pet tend to classify the ferret as an exotic or wild animal, or in some cases, a nuisance animal.

With the advent of sterilization techniques and vaccines, many organizations now consider the pet, whereas previously, it was considered an exotic, wild animal. For example, the Humane Society of the United States (HSUS) has apparently reversed their position on ferrets from a classification of “captive wildlife” to “pet” (see HSUS 2010).

The classifications used by federal agencies was not explored in detail, but the USDA (2006) considers ferrets as domestic animals, as suggested by this excerpt: “...*Domestic ferrets are commonly kept as pets in the United States...*” Governmental agencies below the State level were not thoroughly researched. However, some States reported that municipalities regulated ferrets. For example, New York City has banned the ownership of ferrets, even though the State of New York has not. NYCFerrets.com describes the ban as follows:

“How The Ferret Ban Started. On June 29th, 1999, the New York City Board of Health voted unanimously at its quarterly meeting to establish a list of animals to prohibit as pets in New York City. The list voted on includes ferrets which are now banned as pets in New York City's five boroughs under New York City Health Code Section 161.01. Although the Department of Health is not actively seeking out ferret owners, ferrets found in New York City's five boroughs may be confiscated and turned over to the Center for Animal Control. For many years, the New York City Board of Health has maintained that “Dangerous wild animals naturally inclined to do harm” were prohibited in New York City's five boroughs. The Board of Health also maintained that ferrets fell into that category of “Dangerous wild animals...” However, since ferrets are domesticated -not wild, and since they are neither dangerous nor naturally inclined to do harm, the ban -worded as such- did not apply to ferrets. Ferrets are legal in New York State, and although it is illegal to sell ferrets in NYC, there was no written law anywhere prohibiting their possession inside of New York City. Since the NYC Department of Health was unable to enforce the “Dangerous wild animal...” ban as it applied to ferrets, the Board of Health decided to amend the health code to include a specific list of animals of their own choosing to ban in New York City. Ferrets are included in that list.” (NYCFerrets.com website, <http://www.nycferrets.com/>, accessed June 2010).

In several municipalities in North America, ferret possession is illegal (called “Ferret- Free Zones”), even if the State does not prohibit ownership (see Katie Redshoes, 2001, List of Ferret-Free Zones, <http://pweb.netcom.com/~redshoes/ffz.html>).

### **3.1.1. Summary and Opinion**

In the last 3 decades, the regulatory classification of ferrets was an important issue because the regulatory authority of some state agencies depended upon whether the animal was classified as wildlife/exotic animal or a domesticated animal/pet. With the advent of sterilization techniques and vaccines, most state agencies and non-governmental organizations now recognize the ferret as a pet or domesticated animal. The classification of the ferret in a particular State or municipality is often dictated by its regulatory status. The great majority of State agencies classify it as a pet or domestic animal.

## **3.2. PROHIBITIONS ON IMPORTATION OR POSSESSION**

It is incorrect to state that most States have legalized ferret ownership. For example, Herman (2000) makes the following claim:

“To date, every American state except California and Hawaii has legalized ferret ownership; many states have done so just in the last decade” (p. 39, Herman 2000)

This statement suggests that most States have reversed previous regulations banning ferret ownership. Instead, the Ryan and Jurek (1999) questionnaire and our CSUS questionnaire indicate that many states simply do not regulate ferrets. While the differences in statements may be minor, pro-ferret groups are eager to suggest that there is almost unanimous consensus and increasing momentum among state agencies to legalize and support ferret ownership. Our literature review

and questionnaire did not support this opinion. There are exceptions, such as recent ferret bans in New York City and country-wide in New Zealand. It may be more accurate to say that many state agencies have recently begun to regulate the ferret as they do cats and dogs, and many new statutes have been created to require vaccinations and sterilizations. Schilling (2007) states:

“Some cities and states require that owners obtain licenses or permits for their ferrets. A license can be free (such as in my state of Illinois), or it can cost as much as \$100 per year. In some places, fees are per ferret...” (p. 39, Schilling 2007)

Reproduced verbatim here is summary of the Jurek and Ryan (1999) questionnaire on this subject:

“History of State Legalization. According to these responses, ferrets have never been prohibited by state law in 36 states (72%). In one of these, Ohio, ferrets are not prohibited except for use in sport hunting. Of 14 states with a history of having had prohibitions, eight reported that legalization has since occurred, all within the period 1985-1995. In 1985, a court decision in Alaska resulted in removal of that state’s authority to prohibit ferret ownership. From 1987 through 1995, seven more states legalized ferret ownership. This was done by state legislation in six states and by state wildlife agency action in one (Utah)...In six states, ferrets are prohibited, except under certain conditions (see Classification). Permits are required for possession as pets or for breeding in Kentucky, New Jersey, New York, and Rhode Island. In California and Hawaii, importation and possession for pet keeping or breeding are illegal, as no permits are issued (see Classification).” (pp. 4-5, Jurek and Ryan 1999).

“Prohibition on Release of Ferrets. Asked whether the state has regulations that clearly prohibit the release of ferrets from captivity, 23 states (46%) responded ‘Yes’, and 27 (54%) responded ‘No’. (p. 12, Jurek and Ryan 1999).

Based upon the CSUS questionnaire results, only two States in the USA prohibit the possession of ferrets—California and Hawai’i—this represents no change since the Jurek and Ryan (1999) survey. Some States allow possession only with proof of vaccination or with the purchase of a permit. The following US States have apparently never regulated ferrets: AZ, CO, ID, LA, MN, MO, MT, OR, TN, TX, WA, WV, WI, WY; this statement is based upon CSUS questionnaire responses and has not been substantiated by an exhaustive search of State legislative and policy documents.

When responding to the CSUS questionnaire, Keevin Minami (Land Vertebrate Specialist, Hawai’i Department of Agriculture) wrote the following cover letter:

“Aloha Dr. Graening:

Thank you for allowing the Hawai’i Department of Agriculture (HDOA) to participate in your survey regarding issues surrounding Domestic Ferrets (*Mustela putorius furo*) in Hawaii. The Plant Quarantine Branch of the Hawai’i Department of Agriculture regulates the importation of all non-domestic animals into the State of Hawai’i by referring to various lists of allowable animals that are maintained by the Board of Agriculture. The Ferret falls within the Department’s List of Restricted Animals (Part A). Pursuant to Hawai’i Administrative Rules for the Department of Agriculture, Division of Plant Industry, Chapter 4-71 entitled “Non-Domestic Animal and Microorganism Import Rules”, the import and possession of animals on this list is only allowed as follows:

‘Animals on Part A of the list of restricted animals, for research by universities or government agencies, exhibition in municipal zoos or government-affiliated aquariums, for other institutions for medical or scientific purposes as determined by the board’.

Today, Hawai’i has the highest number of threatened and endangered bird species in the United States and with the added presence of Mongooses there are added pressures on these threatened and endangered bird colonies; allowing the Domesticated Ferret into Hawai’i will only increase those pressures and probably cause extinction, especially with ground nesting birds. As you may be aware Hawai’i benefits from the absence of rabies and another carnivore would only increase that possibility as well.

Sincerely,

Keevin K. Minami  
Land Vertebrates Specialist  
Plant Quarantine Branch, State of Hawai'i Department of Agriculture"

Tomich (1986) discusses the introduction of the Indian mongoose (*Herpestes auropunctatus*) into the Hawai'ian islands and its severe impacts upon native wildlife.

Many States prohibit use of ferrets for hunting; Jurek and Ryan (1999) reported that at least 22 States prohibit use of ferrets in sport hunting. An example of such a prohibition is found in the Indiana regulatory code (see <http://ingov.chacha.com/search/query?query=ferret&sitesearch=http%3A%2F%2Fwww.IN.gov%2Fdnr&mode=ingov&searchwithguide=0>).

Conversely, some States still allow the use ferrets as hunting aids. The Colorado Division of Wildlife is an example, and the wildlife code is provided verbatim here:

"Colorado Division of Wildlife Regulations  
CHAPTER 0 - GENERAL PROVISIONS  
ARTICLE IV - MANNER OF TAKING WILDLIFE

A. Aids Used in Taking Big Game, Small Game and Furbearers - Except as expressly authorized by these regulations, the use of baits and other aids in taking big game, small game and furbearers is prohibited.

3. Other Aids

d. European ferret may be used as an aid in taking small game only in conjunction with hawking. All ferrets used in this activity must be neutered, permanently tattooed on the left inguinal area and dyed along one-fourth (1/4) of their body length for easy field identification."

(Published on the Internet at: <http://wildlife.state.co.us/RulesRegs/Regulations/>)

Some popular sources (e.g., Wikipedia 2010) state that Puerto Rico has banned ferrets; our investigation could not confirm this. We spoke to several staff members of the Puerto Rico Department of Agriculture by phone, and they knew of no regulations specific to the ferret.

Several States require proof of vaccination and/or a warning statement (regarding dangers to small children) at the time of purchase.

### **3.2.1. Summary and Opinion**

There is little consensus among States as to their regulatory status. At least 10 States have never regulated ferrets. Only 2 States (California and Hawai'i) ban importation and possession. There is no indication that Hawai'i State agencies will reverse their stance in the near future. Many States and municipalities are now regulating ferrets as a pet similar to a dog or cat (especially the requirement of vaccinations).

## **3.3. ENVIRONMENTAL IMPACT REVIEW FOR REGULATION**

In Jurek and Ryan (1999)'s survey, the questionnaire results did not indicate that any state agency prepared an environmental impact report during a ferret legalization action:

"Asked whether an environmental impact report, or equivalent, or a written evaluation was prepared for legalizing ferret ownership in the state, no state reported 'Yes', six (12%) reported 'No' (Georgia, Massachusetts, Pennsylvania, Utah, and Vermont), or 'No' and 'Not needed' (New Hampshire). One state (Michigan) responded 'Unknown'. The other states (43, or 86%) reported 'Not applicable'." (p. 14, Jurek and Ryan 1999).

The CSUS questionnaire produced slightly different results:

"Was an environmental impact statement, or other environmental assessment or written evaluation, prepared for legalizing domesticated ferret ownership in your state?"

'Yes' = DC, HI



'No' = AK, AL, AR, AZ, CA, CT(2), DE(2), GA, IA(2), ID, IL, IN, KS, KY(2), MA, MD, MI, MN(3), MT, NB, NC, ND, NE, NJ, NM, NS, NV, NY(2), OH, OK(2), OR, PA, RI, SC, SD, TN, VI, VT, WA(4), WI(2), WV, WY(2)

All other respondents did not respond to this survey question.

Thus, there has been a slight increase (from 0 to 2 States) in the last two decades since the last agency survey of the use of an environmental impact review during the regulation (or de-regulation) of ferrets.

### **3.3.1. Summary and Opinion**

The great majority of States did not use an environmental impact review process during regulatory actions regarding the ferret.

## **3.4. REGULATIONS IN OTHER COUNTRIES**

This study focused on North America. Wikipedia (2010) reviews some potential regulations of ferrets in other countries. The following references to regulations of ferrets in other countries were found:

“In South Africa, the keeping of ferrets has been banned due to concerns that they might escape and naturalise (Pets4U, 2008).” (p. 10, Markula *et al.* 2009)

“In New Zealand, ferrets are listed as an ‘unwanted organism’ under the Biosecurity Act 1993. Unwanted organisms are banned from sale, distribution and liberation throughout New Zealand. Ferrets are also declared as a ‘pest’ in many regional pest management strategies for which other restrictions apply and/or management actions are outlined. The list of specimens suitable for live import (as defined by the Environment Protection and Biodiversity Conservation Act 1999) does not list the ferret or the polecat. Hence, ferrets and polecats cannot be imported into Australia. Ferrets are a Class 1 declared pest animal in Queensland, as defined by the Queensland Land Protection (Pest and Stock Route Management) Act 2002. Only certain entities, such as zoos, can apply for permits to keep ferrets (pets are prohibited). Ferrets are illegal in the Northern Territory where they are listed as ‘Prohibited Entrants’ under the Territory Parks and Wildlife Conservation Act 2007. Ferrets are legal in all other states: a license is required in the ACT under the Nature Conservation Act 1980 (ACT Parliamentary Counsel, 2008) and a license may also be required in Victoria depending on local council laws.” (p. 10, Markula *et al.* 2009)

Schilling (2007) reports that ferreting is still a legal form of hunting in Australia and Europe.

## **4. STEPS TOWARD LEGALIZATION**

The following statements should not be construed as legal counsel. There are two basic paths to the legalization of ferrets: enact legislation or change State policy.

### **4.1. ENACT LEGISLATION**

Pro-ferret groups have apparently not succeeded in acquiring enough petition signatures to get a new ferret legalization bill/initiative/referendum directly on the ballot in California:

“A recent poll paid for by a fundraising campaign directed by Pat Wright, founder of Ferrets Anonymous, found that only 38% of Californians prefer legalization of ferrets. As it turns out, gay marriage, at 43%, rates higher among those of the Golden State.” Dan Reed. 2007. In California, gay marriage rates higher than legalizing ferrets. McClatchy- Tribune News Service. Washington. March 31, 2007. Pg. 1.

“Now it's time to let the Governor know how Californians fell about ferret legalization. Make no mistake. This is NOT a ballot initiative. For those of you who do not know about that process, it takes one million dollars to gather the signatures needed to qualify. Why? Because those signatures need to be valid California voters and issues that

end up on the ballot are there because there was quite a bit of money behind them, enough to pay people to collect signatures. This issue doesn't have that kind of money.” (Carley 2007)

Herman (2000) suggests the following:

“Assuming that AB 854—or some other bill with similar features—passes both houses of the California Legislature, the next question that arises is: How would future management of the ferret issue be handled?

Kenneth Umbach presents the best proposal in his report *Ferrets: A Selective Overview of Issues and Opinions*. Umbach proposes (in opposition to unrestricted ownership, continued prohibition, or an ownership-and-study proposal similar to AB 854) ownership with four requirements: (1) sale only through licensed breeders or animal welfare agencies, (2) vaccination against rabies and other animal diseases, (3) spaying or neutering before sale, and (4) a public education program to inform prospective ferret owners, and other pet owners, about the appropriate circumstances for ferret ownership.

Umbach's suggestions are reasonable and compatible with the concerns of the various California agencies. As noted earlier, vaccination is usually required for ownership of ferrets, and spaying and neutering are also required in some states. Limiting sales to licensed breeders and sellers would help to ensure compliance with animal control laws, particularly with regard to vaccination and spaying and neutering, as well as ensuring that prospective owners would obtain healthy, properly treated ferrets instead of sick and mistreated animals. The spaying and neutering requirements would sharply reduce the likelihood of feral colonies establishing themselves through the escape of unaltered ferrets capable of reproducing. A public education program could also protect pet owners—and their families—from making the mistake of buying animals that are unsuited to their households. After all, ferrets are not suitable for everyone, particularly for families with very young children (as is the case with other pets). Such a program could also persuade owners to properly care for their ferrets and reduce the chances of attack or escape.

California's hostile stance toward the ferret is more antiquated and unjustified than ever due to increasingly ferret-friendly legislation in other states, the development of an effective rabies vaccine, and statistical evidence indicating that ferret feral capabilities and destructiveness toward children and wildlife are exaggerated. As of 1999, California and Hawaii remain the only states that ban ferret ownership; many states not only allow ownership, but classify ferrets as domestic animals and not as wild animals. The few cases to address the issue, although negative, are limited by recent developments and studies, and by legislation reversing or limiting their holdings. Thus, California's classification of ferrets as "undesirable" wild animals should be reconsidered, and ultimately abandoned, to be replaced with qualified and restricted legalization and reclassification of ferrets as domestic animals under section 655 of the California Civil Code, whose ownership is protected by the California Constitution.” (pp. 52-53, Herman 2000)

Various California legislators and agency personnel have criticized attempts to legalize ferret ownership through the legislative process because it bypasses the need for environmental impact review, which is required by CEQA for non-legislative decisions by State agencies.

#### **4.1.2. Summary and Opinion**

Enacting legislation is the most immediate way to legalize ferrets in California. This method does not require the support of CDFG and does not require CEQA compliance or any environmental impact review process. This method requires significant amounts of money and public support; pro-ferret organizations have not yet been successful in garnering enough public support to enact legislation.

### **4.2. CHANGE OF POLICY BY THE STATE OF CALIFORNIA**

This report does not represent the official opinion of the State of California or CDFG.

To legalize the importation and possession of ferrets in California by a policy change, the most direct way is apparently to have the California Fish and Game Commission change the status of the ferret by a majority vote at a Commission



meeting, and then the Fish and Game Code §2118 would be changed to include the ferret as an exception to the wild animals regulated under §2116. The California Fish and Game Commission will probably require adherence to its 2005 policy document *Miscellaneous Policies: Introduction of Non-Native Species* before ferrets are legalized in California, which requires careful evaluation of the potential impacts of introduction, including the species' ability to disperse outside the introduction area, and an initial experimental introduction into a confined area, or the introduction only of sterile individuals (John Fisher, California Fish and Game Commission, pers. comm., 2009).

An impact analysis was performed by Umbach (1997) and discussed the policy options available to the Commission, and excerpts are provided here:

“Selected Policy Options

The following are options, not recommendations.

No change—continued prohibition. Continue to prohibit domestic ferrets in California. One risk of this option is that the ferrets that are already kept as pets in California would be less likely to receive necessary and appropriate vaccinations and veterinary care than they would if permitted.”

End the prohibition without restriction or qualification. One risk of this option is the possibility of escaped or released ferrets becoming a nuisance or a hazard to wildlife.

Permit ownership of pet domestic ferrets (*Mustela putorius furo*), with requirements that they (1) be provided only through licensed breeders/sellers (or through animal welfare agencies, such as local animal control departments and humane societies), (2) be vaccinated against rabies (and other diseases as may be appropriate as a public health concern), (3) be spayed or neutered before being sold or given to pet owners, and (4) be the subject of a public education campaign designed to assure that pet owners understand the circumstances under which ferrets are and are not appropriate pets. This option might reduce the risks of the previous option, but would involve potential costs of regulation, enforcement, and education.

Permit ownership of pet domestic ferrets, with requirement for a subsequent formal study of impact on wildlife. This option was proposed in the April 15, 1997, hearing of the Assembly Water, Parks, and Wildlife Committee as an amendment to AB 363 (Goldsmith). Under this option, details yet to be announced, a formal scientific study would be commissioned for completion within five years of legalization of pet ferrets. The study would determine what impact on native wildlife, if any, had resulted from the change in the law through infiltration of escaped ferrets into natural settings. This option raises a possible concern that, if the study found detrimental effects, it would be too late or too difficult to correct them and disruptive to attempt at that time to again prohibit ownership of domestic ferrets in California. It is possible that legalization would lessen the care with which current (but illegal) ferret owners assure that their pets do not leave their homes, and that there might therefore be increased risk of predation by ferrets upon native wildlife or even establishment of feral colonies. On the other hand, this option would provide at least some assurance that impacts would be studied properly within a defined and reasonably near-term period while enabling ferret owners to have their pets vaccinated, spayed or neutered, and provided with other necessary and appropriate veterinary care, which is not currently available in California. Those who are confident, on the basis of existing data, that domestic ferrets do not pose a risk to native wildlife in California may favor the choice to legalize now, with the safeguard of follow-up study of impacts. Those who feel that the evidence indicates a demonstrated threat to native wildlife may prefer to study potential impacts more thoroughly before legalization in California. Such a prior study could take the form of (1) scientific testing of ferret survival capacities in California under controlled conditions, (2) systematic examination of evidence from other states and nations and preparation of an impartial and thorough report on the findings, or (3) both.” (page 6, Umbach 1997)

#### **4.2.1. Addressing Concerns and Objections Raised by CDFG**

The following discussion is a summary of the inferred concerns and objections of CDFG based upon literature and file review, the review of the available internal agency correspondence, and personal interviews of CDFG staff.

The following CDFG concerns or issues would need to be addressed before they would support a change in policy or support a legislative bill:

- Compliance with CEQA. The Draft and Final Environmental Impact Report would need to demonstrate that any significant impacts can be mitigated to a less-than-significant level, or the Lead Agency (the Commission) would need to file a Statement of Overriding Considerations which determines that benefits to the public outweigh unmitigable environmental impacts.
- Assurance that ferrets will not establish feral breeding populations and impact wildlife, or the environment in general
- Procurement of funds to regulate ferrets, similar to that for cats and dogs, including the creation and maintenance of a license system, and to monitor compliance.

Even if the importation and possession of ferrets were to be condoned by CDFG, some restrictions would likely remain. CDFG is likely to require the following:

- Importation of only sterilized ferrets
- No breeding of ferrets in California
- No importation or possession of polecat-ferret hybrids or polecats
- Rabies and distemper vaccinations before a certain age
- Prohibition of ferrets on all of California's islands, which are sensitive to exotic mammal introductions
- Prohibition of release of ferrets into the wild

In the past, CDFG has not been convinced that ferrets will not establish feral breeding populations and impact wildlife, or the environment in general; recent correspondence with CDFG staff indicates that this position has not changed (Dale Steele, CDFG Non-game Program, pers. comm. 2010). If only sterilized ferrets were allowed to be imported and possessed in California, biological fact dictates that sterilized ferrets could not establish a breeding population. However, the issue focuses on the potential illegal importation of fertile ferrets or fertile hybrids or polecats into California. After all, CDFG has not been able to stop the importation of hundreds of thousands of ferrets into California in the last 50 years while a full ban has been in effect. After legalization of ferrets, it is not out of the realm of possibility that Californians might wish to own a more rare, exotic, or charismatic mustelid, such as a polecat-ferret hybrid or polecat, as do the owners of wolf-dog hybrids.

Various strategies have been suggested to determine whether or not (fertile) ferrets could establish feral breeding populations and impact wildlife:

- Analysis of case studies involving unconfined ferrets or polecats in the USA and worldwide
- Performance of a controlled experiment or pilot study
- Performance of a risk analysis or cost-benefit analysis

We provide an analysis of case studies in Section 8. Following is a discussion of potential controlled experiments/pilot studies and risk analyses.

#### **4.2.2. Performance of a Controlled Experiment or Pilot Study**

A research study (*i.e.*, a controlled experiment or pilot study) could be performed that investigated the potential for pet ferrets to revert to a feral condition and survive in the wild; most authors envision fencing pet ferrets in large enclosures in the wild and determining if ferrets can survive and breed on the available wildlife and in various representative climates. Umbach (1997) suggested such a study:

“How Could the Issue of Wildlife Impact be Tested?”

Following are options for consideration. These are not intended as recommendations.

Wildlife biologists might be able to fit a number of ferrets with miniature transmitters and set them loose in a designated area to track their movements. If the ferrets do not survive, that would tend to support the view of the proponents. If they in fact attack wildlife or endanger habitat in the designated area and if they survive for a significant period, then that would be significant evidence against legalization. Alternatively, a number of ferrets could be set loose in secured areas (but not fitted with monitoring devices) and their survival and impacts observed over a period. Alternatively, and easier to accomplish, the Legislature could commission an extensive and impartial survey of states in which possession of ferrets is legal, conducted by an agency or organization, such as the California Research Bureau, that is not a party to the dispute over legalization, to determine what impacts have been observed. Such a survey could query academic experts, state wildlife officials, state and local chapters of wildlife organizations, veterinary organizations, and farm organizations.” (pages 5-6, Umbach 1997)

In 1986, Eldridge Hunt (CDFG Wildlife Management Division Chief) wrote this opinion:

“In addition to the literature search that provided documentation of feral ferret populations, research investigations were considered and discussed with two prominent wildlife investigations experts. One was Dr. Lee Fitzhugh, U.C. Extension Wildlife Specialist, Davis, California. The other was Dr. Reg Barrett, U.C. Berkeley, Associate Professor, Wildlife Management. Both of these wildlife investigations authorities agreed that 1.) the laws should not be weakened in California that preclude the importation and possession of ferrets and 2.) a laboratory or field study to determine the ability of domestic ferrets to survive in the wild would be very difficult, take a long time and be plagued with escaping test animals. Dr. Fitzhugh suggested that a study might be feasible in some other state where ferrets are legal if enough money was available for a year or more study. He also suggested that a study is not necessary as a comprehensive literature search would probably do the job. Dr. Barrett suggested a review of worldwide climates/habitat similarity that support known feral populations could be compared to California habitats. He also suggested that if people are truly concerned about the welfare of ferrets that they should direct funds and efforts into the reestablishment of our endangered black-footed ferrets in their former range.” (pp. 2-3, Hunt 1986)

In the early 1990s, California Domestic Ferret Alliance apparently created a research proposal to determine whether or not (pet) ferrets could survive and breed in the wild. In 1993, Phil Nelms (Captain, CDFG Wildlife Protection Division), wrote an opinion letter, some excerpts here reproduced verbatim:

“If ferrets are no longer a threat to California’s major poultry producers, nor pose a serious rabies risk to humans, I believe both the Department of Food and Agriculture (F&A) and Department of Health Services (DHS) may not be able to continue their support of prohibiting ferrets. The Department should maintain a position strongly supporting restriction of ferrets until we are CERTAIN they do not pose a threat to native wildlife. If they cannot survive/breed in the wild, I recommend total deregulation and acceptance of CDFA’s proposal number one. In order to determine what threat ferrets pose to wildlife of California we should recommend:

- A three year Ph.D. study at University of California, Davis, or similar reputable institution, to determine the potential of ferrets to survive/breed in California. If CDFA is certain of their research, they should be willing to use funds they have available for litigation to fund the study.
- The study should include appropriate sites at the campus, in the foothills between Marysville and Grass Valley, at Hopland Deer Station, an appropriate coastal bylands site, and a site in Southern California.
- All parties, DFG, F&A, DHS, and CDFA, agree to base future regulations, or lack of same, on the results.
- If ferret’s survive and breed—continue restriction. If they survive only, but do not breed—modify restriction accordingly. If they do not survive—deregulate completely at state level.

Nelms (1993)’s opinion letter also states:

“Popularity of ferrets as pets is not an important consideration in protecting California wildlife (except to provide some basis for our concern there are a lot of them ‘out there’ posing a great risk)....It is not important that we are one of only two to five states currently with a ban if our biology supports our regulation...California has thousands of square miles where temperatures rarely exceed 90 degrees...F&A may not continue support of restrictions based

on low threat to domestic poultry. If our biology is correct, the threat to wild-nesting native birds is sufficient to justify restriction without F&A support.”

#### **4.2.3. Performance of a Risk Analysis and/or Cost-Benefit Analysis**

Another approach would be to use a predictive model to determine if ferrets had the potential to establish feral breeding populations in California, or to perform a cost-benefit analysis that weighed the relative costs of legalization (cost of licensing, regulating, and monitoring, any impacts to wildlife or environment, etc.) and the benefits of legalization (license program and pet industry revenue, any increases in numbers of vaccinated ferrets, etc.). A cost-benefit analysis is outside of the scope of this study.

In 1997, researchers from UC Davis submitted to Ron Jurek (CDFG) a draft research proposal whose goal was:

“...a combination of quantitative risk assessment, cost-benefit analysis, decision-tree analysis and geographic information systems can be used to develop a risk assessment process that can provide objective data for public policy decisions related to ferret legalization.”

Their method description was stated as:

“Initially we will develop a geographic information system using habitat maps for California, and overlay distributions of known predators and threatened and endangered species in the state. This will define areas (and estimate the proportion of the state) in which survival and reproduction of ferrets would be likely to occur, and help evaluate potential impacts of ferrets on native wildlife. Probability distributions associated with survival and reproduction in these areas will be estimated. These probabilities will be derived empirically, whenever possible, but will likely require ‘expert opinion’. Other empirically-derived probability estimates will be based on literature review and field surveys (including field work in the San Juan Islands). Methods for incorporating expert opinion in the analysis will follow recommendations of Vose (1993). All possible scenarios for establishment of wild populations will be evaluated. Current ferret numbers and their distribution will be assessed.”

Bomford (1991) created a risk assessment model that employed a cost-benefit analysis to the decision of whether or not to allow introduction of an exotic vertebrate. Bomford and Hart (1998) elaborated on the cost-benefit analysis:

“The forms of adverse impact that an established population of an escaped exotic animal could cause include:

- reduction of agricultural productivity (competition with grazing stock for feed and water, damage to horticultural crops, predation on stock, land degradation)
- environmental damage (competition with native species for food, water, and shelter)
- spread of parasites or diseases
- attack, harassment, or annoyance threat to the community, particularly in the urban environment
- structural damage
- cost and collateral impact of control measures

The Benefit.

Exotic species can bring many benefits to agricultural production, recreation, tourism, scientific and medical research, international conservation efforts, and education. Many of Australia’s agricultural and recreational industries are based on introduced animals and there is ongoing demand to import new species and genotypes.” (p. 406, Bomford and Hart 1998)

“The key issues relating to assessing the risk of importing and keeping exotic vertebrates are:

- What is an acceptable level of risk relative to potential benefits for the import and keeping of exotic species?
- How can we minimize risk exposure (i.e., controlling the number and type of exotic species imported in the country) and manage the risk that we accept (i.e., management of the species that are introduced)?
- What criteria can be used to assess the potential costs and benefits of importing and keeping exotic species in Australia?”

(p. 407, Bomford and Hart 1998)



“Until 1991, VPC, Environment Australia, and AQIS had no framework or guidelines for assessing the risks associated with the import and keeping of potential vertebrate pest species in Australia. Risk assessments were made in a fairly subjective way and were difficult to justify if political pressure was brought to bear to alter a decision. Bomford’s 1991 model was developed on the premise that the import and keeping of exotic vertebrates should be subjected to a balanced and rigorous risk assessment, taking into account both potential benefits and harmful impacts, and using all available scientific theory and information on the biology of the species being assessed. It should be emphasized that, given the uncertainty of the assessment due to incomplete information, it is a predictive model rather than an absolute measure of risk. Thus, a conservative approach should be adopted along the lines of the precautionary principle: ‘the absence of evidence of risk does not equate to the evidence of an absence of risk’ (Moller and Barret 1996). It is likely that community demands and international obligations under WTO agreements concerning free trade will result in increasing numbers of species being imported into and kept in Australia. Thus, there is a need to develop transparent, evidence-based risk assessment processes to increase decision-making objectivity and reduce the influence of social, economic, and political pressures. Risk assessment processes should be developed in conjunction with interest groups to achieve transparency and enhance compliance, although the assessment itself should be entirely independent of these groups. Interest groups should pay for the application of the risk assessment process in accordance with the user-pays principle (AQIS 1991).” (p. 407, Bomford and Hart 1998)

“The current risk assessment process.

Ecological theory relating to each of the component processes associated with exotic species introductions are considered by the current risk assessment model used in Australia. The component processes are the probability of:

- an exotic species escaping
- the escapees establishing a wild population
- the escapees or established population being eradicated
- harm associated with the three former factors outweighing the potential benefits associated with the species being imported.”

(p. 407, Bomford and Hart 1998)

Forsyth *et al.* (2003) expanded upon Bomford and Hart (1998)’s work and refined their predictive model. Forsythe *et al.* (2003) developed this computer model to analyze the success or failure of vertebrate introductions into Australia. They determined that for both mammals and birds, species were more likely to successfully establish where they had wide climate tolerance or that the climate of their native range matched that of Australia, where they had been successfully introduced elsewhere, where more effort had been put into their introduction, and where the body size was small and reproduction rates fast. They concluded:

“Although the above factors have useful explanatory value, the outcome of any one introduction can remain difficult to explain. For example, the polecat-ferret (*Mustela putorius furo*) has a close climate match with Australia. Despite this, and the fact that it must have been deliberately and inadvertently introduced many times, this species has failed to become established. Releases of the species in Australia have mostly involved animals from the domestic end of the pole-cat spectrum, and it may be that domesticated forms are less likely to establish wild populations than undomesticated polecats. Releases in New Zealand, where the species has established a wild population, included polecats (Blandford 1987). Alternatively, factors unrelated to introduction effort and climatic suitability may be important. One possibility is that ferrets exhibit inappropriate antipredator behavior towards foxes and are quickly preyed upon (Georges 2000). The ferret has established widespread populations in New Zealand, where there are no larger predators.” (p. 566, Forsyth *et al.* 2003)

Smallwood and Salmon (1992) provided a review of the literature on the impact of exotic species upon native wildlife. They then created a rating system and applied it to species of concern in California; an excerpt is provided:

“A rating system was developed to prioritize research and control efforts for preventing species invasions and eradicating established exotic pests. Four rating criteria were the species potential (1) to be introduced; (2) to establish; (3) to cause damage; and (4) to be controlled. Each species was rated independently for each criterion and these ratings summed to provide a total score. The system was developed with 24 exotic bird and mammal

species with well-known invasion and pest histories. It was then run on 14 of the California Department of Food and Agriculture most wanted exotic species list. The European ferret scored 25 out of a total 27 points....A quick response apparatus was also developed to provide information on perceived exotic species threats. It consisted of a data base of expert contacts and citations on exotic pest species damage, biology, ecology and control technology.” (Smallwood and Salmon 1992)

Species with total scores of greater than 24 were recommended for inclusion on California Department of Food and Agriculture's most unwanted species list (Smallwood and Salmon 1992). However, Smallwood and Salmon (1992) did not provide the rationale for, or any data to support, the score given to the ferret. The Smallwood and Salmon (1992) study is widely discredited by pro-ferret organizations.

The basic challenge of a cost-benefit analysis is to convince CDFG that the benefits greatly outweigh the costs (or detriments) of ferret legalization. In a 1991 letter to Jeanne Carley (Californians for Ferret Legalization), Jerry Clark (Senior Biologist, CDFG Control and Eradication Division), stated a common CDFG opinion:

“The possible introduction of an exotic animal, even if that possibility is remote, is not worth the chance. We don’t need any more examples like the English sparrow, starling, opossum, African clawed frog, or the carp; these are successfully competing with our native wildlife.”

A brief and non-comprehensive inventory of adverse and beneficial economic impacts is presented next.

#### **4.2.3.1. *Potential Adverse Economic Impacts***

In 2005 in their legislative analysis of Bill AB 647, a CDFG memo stated:

“Fiscal Impact [of ferret legalization].

Staff of wildlife areas, especially those located near residences, would ultimately need to include ferrets, along with dogs and cats, as potential urban predators, since an increase in ferret ownership would be anticipated following legalization. Similar impacts would likely occur in State Parks.

Economic Impact.

If the bill were to become law, there would likely be a large influx of domestic ferrets into California and the veterinary profession and pet supply businesses would gain increased business. A new financial burden on cities and counties would be expected from the large numbers of lost or abandoned ferrets, for which animal control agencies and shelters would be responsible. Also, many cities and counties would need to amend their animal ordinances to include ferrets. Retail pet stores can be expected to benefit from sales of ferrets which currently are only available outside California.”

In 1995 in a letter to the CDFG Wildlife Protection Division, William Sandige (Program Supervisor, Pest Exclusion Branch, Department of Food and Agriculture) estimated costs involved in running the border station programs at over 8 million dollars; Sandige also tallied the following number of instances of attempted (illegal) animal importations in just year 1995: 219 instances of intercepted ferrets, 3 instances of alligator, 1 instance of 46 baboons, 2 instances of black bear, 1 of catfish, 1 of chimpanzee, 1 of crayfish, 1 of crow, 1 of flying squirrel, 36 of gerbil, 2 of hawks, 9 of hedgehog, 1 of live fish, 40 of Monk parakeet, 1 of orangutan, 1 of prairie dogs, 1 of raccoon, 4 of snapping turtle, 2 or squirrel, 3 of tortoise, and 1 of waterbuck.

Various federal agencies report on the high cost of managing invasive species—an excerpt is provided here:

“Introduced non-native species may cause widespread destruction by rapidly taking over an area and eliminating economically profitable native species. This can result in enormous spending by state and federal agencies as they attempt to eradicate pests and restore natural species. A study published by the US Congress, Office of Technology Assessment, Harmful Non-Indigenous Species in the United States, finds that the US alone spends hundreds of millions to perhaps billions of dollars trying to repair the damage of harmful exotic species. Numerous other economic sectors may be negatively affected, including agriculture, forestry, fisheries and water use, utilities, and natural areas. Exotic species may cause economic damage by (1) hybridizing with valuable species and producing worthless crossbreeds, (2) carrying or supporting harmful pests, and (3) possibly reducing



recreational prospects in an area. Another part of economic impact is one which has social and health consequences as well.

For example, Great Lakes water users spend tens of millions of dollars on zebra mussel control every year. Affected municipalities and industries, using large volumes of Great Lakes water, expend approximately \$360,000 per year on zebra mussel control; small municipalities average \$20,000. Nuclear power plants average an additional \$825,000 of additional costs per year for zebra mussel control. As the zebra mussel spreads to inland lakes and rivers across North America, such as the Mississippi River Basin and Lake Champlain, so do the costs to water users.

Not only may exotic species import diseases that affect related species, but humans as well. Often cures are costly. The threat of non-indigenous species is their unpredictability. They may be poisonous, serve as vectors for human disease, or create conditions for disease to spread. Invading species may also breed with native species, resulting in dangerous or poisonous hybrids, which humans may unknowingly consume. Other invading species of fish (such as the sea lamprey, ruffe and round goby) can harm native fish. Reductions in native fish populations (such as lake trout, walleye, yellow perch and catfish) threaten a sport and commercial fishing industry that is valued at almost \$4.5 billion annually and supports 81,000 jobs.” (Exotic Aquatics on the Move, a Joint Project of National Sea Grant Network & Geographic Education Alliances; <http://www.iisgcp.org/exoticsp/ans.htm>)

#### **4.2.3.2. *Potential Beneficial Economic Impacts***

One obvious beneficial economic impact of ferret legalization would be the creation of a licensing system and the generation of licensing program revenues. This would only be a beneficial economic impact if the license program revenues exceeded the cost of running the licensing program. Another potential economic benefit is the stimulus of the pet trade and pet supply industry. A pro-ferret organization opinion is reproduced here:

“Ferret fanciers, the vast majority of whom are working or professional women between the ages of 35 and 54, annually spend an estimated \$400 million on their pets in food, medical care, supplies and toys, and, increasingly, travel to and participation in championship ferret shows. (They spend an additional \$16,000,000 in sales taxes).” (p. 33, Phillips and Shimbo 1990).

Note however that the State of California does not currently interfere with the sale of ferret-related pet products.

Pro-ferret organizations also argue that enforcing the ban on ferrets has an adverse economic impact. Excerpts are provided:

“Enforcing this unnecessary ban wastes state resources.” (Ferrets Anonymous 2010)

“The DFG’s intransigence certainly produces fiscal costs. The Department of Food and Agriculture must enforce the ban at its inspection stations. From 1980 to 1995, the number of interceptions has increased more than 260 percent, from 70 to 256. While the Department of Agriculture won’t put a price on enforcing this policy, it no doubt exists....The DFG itself has squandered public resources holding meetings, producing supposed fact-sheets and writing letters in opposition to the legalization of ferrets. It also wastes money enforcing the law, sending as many as five law enforcement officers to a single ‘ferret bust’.” (p. 18, Lynch 1996)

Marshall Farms USA Inc. brought a lawsuit against the California Fish and Game Commission (filed December 9, 1996, San Diego County Superior Court) on the grounds that companies that breed ferrets are adversely economically affected, as they are precluded from selling pet ferrets in California; the suit was not successful.

The economic impacts, both beneficial and adverse, of ferret legalization may need to be analyzed further in the EIR.

#### **4.2.4. Summary and Opinion**

To legalize the importation and possession of ferrets in California by a policy change, CDFG concerns would need to be addressed and mitigated. CDFG is concerned with the cost of managing a regulatory program for ferrets; it is not clear if

license revenues would full cover these costs. More importantly, CDFG would need assurance or proof that fertile ferrets, hybrids, or even polecats will not establish feral breeding populations and impact wildlife, or the environment in general. The simplest solution is to allow only sterilized ferrets to be imported into California. However, it would be impossible to stop the importation of fertile ferrets or hybrids or polecats in to California, as evidenced by the current ease of importing a ferret into California during a full ban. Various strategies have been suggested to determine whether or not ferrets could establish feral breeding populations and impact wildlife: analysis of case studies involving unconfined ferrets or polecats, performance of a controlled experiment or pilot study, or performance of a risk analysis or cost-benefit analysis. Such a study or analysis would be costly and would take several years to complete; because of the possibility that hybrids or polecats could be imported into California, the study would need to analyze hybrids and polecats as well. Both pro-ferret organizations and anti-ferret organizations would need to agree upon the methods and conduct of the study. We are skeptical that such a study could either fully condemn or exonerate the performance of fertile ferrets, hybrids, and polecats in a wild California setting.

The economic impacts, both beneficial and adverse, of ferret legalization may need to be analyzed further in the EIR.

## **5. DATA COMPILATION METHODS AND RESULTS**

### **5.1. LITERATURE REVIEW**

#### **5.1.5. Journal and Textbook Review**

The literature search was limited to the English language, and focused on the North American region. The literature regarding the use of the ferret as a laboratory subject, and in biomedical research, was ignored; the exception was any subjects pertaining to human safety, such as rabies or physical attack. See bibliographies such as that by Clingerman *et al.* (1991) to pursue this literature.

The following previously published bibliographies on ferrets and polecats were examined intensively:

- Shump, A.U., K.A. Shump Jr., G.A. Heidt, and R.J. Aulerich. 1976. A bibliography of Mustelids: Part I—Ferrets and Polecats. Michigan Agricultural Experimental Station, East Lansing, Michigan. 53 pp.
- Blandford, P.R.S. 1987. Biology of the polecat *Mustela putorius*: a literature review. Mammal Review 17(4):155-198.
- Whisson, D., and T. Moore. 1997. An annotated bibliography on the ferret (*Mustela putorius furo*). California Department of Fish and Game, Wildlife Management Division, Bird and Mammal Conservation Program Rep. 97-3, Sacramento, CA. 37 pp.

At least 250 journal articles and textbooks were reviewed.

#### **5.1.6. Newspaper Article Review**

At the Sacramento State Library, the ProQuest (Newspaper) Database (ProQuest LLC, Cambridge Information Group) was accessed through a CSUS subscription; this database allows the search of newspapers from 1977 to the present, and is the largest digital newspaper archive. Queries began with different combinations of key words and strings such as: ferret, ferret\*, pet, pet\*, bite, bite\*, wildlife, livestock, poultry, harass, rabies, legalization, etc.

### **5.2. INTERVIEWS AND OTHER SOURCES**

Phone conversations / interviews were cited as personal communications; transcripts were recorded where possible and can be provided upon request. Mr. Dale Steele (CDFG Wildlife Nongame & RAP Programs) was interviewed on August 17, 2010. Mr. Steele also made available CDFG's entire file collections on ferrets (primarily from Ron Jurek's work), which consisted of over 8 feet of stacked documents. CDFG file reviews were performed on August 17 and 19, 2010.

Internet search engines were used to access Internet resources. State agency websites were searched for information and policies regarding ferrets. New Zealand websites were also consulted including:

- <http://www.agresearch.co.nz/>

- <http://www.landcareresearch.co.nz/research/wildlifeecol/ferrets/>

Pro-ferret organizations' websites were also reviewed, including:

- Ferret Central: Home of the Ferret Frequently Asked Questions <http://www.ferretcentral.org/>
- Ferrets Anonymous, <http://www.ferretsanonymous.com/>
- American Ferret Association, <http://www.ferret.org/index.htm>
- Ferrets Magazine, <http://www.smallanimalchannel.com/ferrets-magazine/ferret-exclusive-topiclist.aspx>
- Modern Ferret Magazine, <http://www.modernferret.com/index.html>

## 5.3. STATE AGENCY QUESTIONNAIRE

### 5.3.7. Questionnaire Methods

Several surveys of state agencies have been performed by others:

- California Domestic Ferret Alliance (1988)
- In early 1990s, the New Hampshire Fish and Game Public Affairs Division apparently distributed a questionnaire on ferrets (retyped in Californians for Ferret Legalization 2000); this has not been verified.
- Jurek and Ryan (1999)

Jurek and Ryan (1999) surveyed all of the wildlife agencies in the USA; the results of this survey are discussed later in this report. In our review of the agency responses to Jurek and Ryan (1999)'s questionnaire, it became apparent that many wildlife agencies did not want to, or could not, respond to the questionnaire because another agency in their State (agriculture or health agency) regulated ferrets and thus, kept the pertinent records. Therefore, an attempt was made to get a response from each State's health agency and agriculture agency, besides their wildlife agency. The data solicitation for our study was expanded to the Canadian Provinces as well, although this was outside the scope of the study contract. The solicitation would ideally have been provided in the French language as well, but was not.

One of the goals of this study was to replicate and update the Jurek and Ryan (1999) questionnaire. For the most part, our questionnaire faithfully reproduced the questions in Jurek and Ryan (1999). Some questions were added or modified to address the current perceived concerns expressed by the Commission or CDFG. Another modification was the addition of questions that allowed the agency respondent to estimate a value using their professional opinion, such as number of ferret attacks on humans per year, when such data were not available. The questionnaire was created and printed as a hardcopy document. It was also produced as a Microsoft Word 2003 document using password protected form fields and an Adobe Acrobat 9 Portable Document Format (PDF) password-protected form, both of which allowed respondents to type in their responses via computer, but not alter the questions. See Appendix A for a copy of the blank questionnaire.

The questionnaire was distributed by regular mail and electronically by email; pre-paid Federal Express air bills addressed to the CSUS Department of Biological Sciences were provided in the mailed questionnaires to facilitate questionnaire submittal. Logs were kept of all correspondence with governmental officials (provided in Appendix B). Email correspondence was saved in its native format (Microsoft Outlook file format ".msg") and printed to PDF. CSUS Department of Biology students Navneet Shah and Angela DePalma-Dow assisted Dr. Graening in the dissemination of the questionnaires, correspondence with agency personnel, and tabulation and database entry of the questionnaire responses.

### 5.3.8. Questionnaire Results

Completed questionnaires received as email attachments were saved in their native formats and also printed to PDF. Completed questionnaires received by US post or by Federal Express were digitally scanned to PDF. Appendix C provides these questionnaire responses. Some States sent separate responses from each participating agency; other States combined their answers into one response. Many respondents sent in questionnaires with many questions left blank, and answers only to questions in their area of expertise. Unclear answers were followed up by telephone call. For those agencies who did not submit a completed questionnaire, reminder emails and phone messages were provided to encourage even a late submission. When no written response was ever received, an attempt was made to interview the appropriate

agency personnel by phone and complete answers to the questionnaire by this method. These phone interviews are documented as separate data sources in Appendix C.

Each of the 50 States and 3 of the 12 Canadian Provinces provided at least a partial response to the questionnaire (see following table). Of the possible 150 agencies in the USA (a wildlife, agriculture, and health agency in each State), 39 wildlife agencies, 20 agricultural agencies, and 17 health agencies provided at least a partial response. The global economic recession has apparently hindered response to our questionnaires, as several agency personnel stated that they did not have sufficient manpower or funds to participate in the study, and often blamed the national economic recession.

The responses to the questionnaire were entered into a relational database (Access 2007, Microsoft, Inc.). Results of the questionnaire are discussed later in this report. For brevity, standard postal abbreviations for the United States of America (USA)'s States and Canada's Provinces were used:

Canadian Provinces—Alberta = AB, British Columbia = BC, Manitoba = MB, New Brunswick = NB, Newfoundland and Labrador = NL, Nova Scotia = NS, Northwest Territories = NT, Ontario = OT, Prince Edward Island = PE, Quebec = QC, Saskatchewan = SK, Yukon = YT; and United States—Alabama = AL, Alaska = AK, Arizona = AZ, Arkansas = AR, California = CA, Colorado = CO, Connecticut = CT, Delaware = DE, Florida = FL, Georgia = GA, Hawai'i = HI, Idaho = ID, Illinois = IL, Indiana = IN, Iowa = IA, Kansas = KS, Kentucky = KY, Louisiana = LA, Maine = ME, Maryland = MD, Massachusetts = MA, Michigan = MI, Minnesota = MN, Mississippi = MS, Missouri = MO, Montana = MT, Nebraska = NE, Nevada = NV, New Hampshire = NH, New Jersey = NJ, New Mexico = NM, New York = NY, North Carolina = NC, North Dakota = ND, Ohio = OH, Oklahoma = OK, Oregon = OR, Pennsylvania = PA, Rhode Island = RI, South Carolina = SC, South Dakota = SD, Tennessee = TN, Texas = TX, Utah = UT, Vermont = VT, Virginia = VI, Washington = WA, Washington District of Columbia = DC, West Virginia = WV, Wisconsin = WI, and Wyoming = WY.

| Summary of Agency Response to the CSUS Questionnaire |          |             |        |
|------------------------------------------------------|----------|-------------|--------|
|                                                      | Wildlife | Agriculture | Health |
| <b>USA</b>                                           |          |             |        |
| Alabama                                              | X        |             | X      |
| Alaska                                               | X        |             |        |
| Arizona                                              | X        |             |        |
| Arkansas                                             | X        | X           | X      |
| California                                           |          | X           |        |
| Colorado                                             |          | X           |        |
| Connecticut                                          |          |             | X      |
| Delaware                                             | X        | X           |        |
| Florida                                              |          | X           |        |
| Georgia                                              | X        | X           |        |
| Hawai'i                                              |          | X           |        |
| Idaho                                                | X        |             | X      |
| Illinois                                             | X        | X           |        |
| Indiana                                              | X        |             |        |
| Iowa                                                 | X        | X           |        |
| Kansas                                               | X        | X           |        |
| Kentucky                                             | X        |             | X      |
| Louisiana                                            | X        |             | X      |
| Maine                                                | X        | X           | X      |
| Maryland                                             | X        | X           | X      |
| Massachusetts                                        | X        |             |        |
| Michigan                                             |          | X           |        |

|                                  | Wildlife | Agriculture | Health |
|----------------------------------|----------|-------------|--------|
| Minnesota                        | X        | X           | X      |
| Mississippi                      | X        |             |        |
| Missouri                         | X        |             |        |
| Montana                          | X        |             |        |
| Nebraska                         | X        |             |        |
| Nevada                           | X        |             |        |
| New Hampshire                    | X        |             |        |
| New Jersey                       | X        | X           | X      |
| New Mexico                       | X        |             |        |
| New York                         | X        |             |        |
| North Carolina                   | X        |             |        |
| North Dakota                     |          |             | X      |
| Ohio                             |          |             | X      |
| Oklahoma                         | X        | X           |        |
| Oregon                           |          |             | X      |
| Pennsylvania                     | X        |             |        |
| Rhode Island                     | X        |             |        |
| South Carolina                   | X        |             |        |
| South Dakota                     | X        | X           |        |
| Tennessee                        | X        |             |        |
| Texas                            | X        |             |        |
| Utah                             |          | X           |        |
| Vermont                          | X        |             |        |
| Virginia                         |          |             | X      |
| Washington                       | X        | X           | X      |
| Washington, District of Columbia |          |             | X      |
| West Virginia                    | X        |             |        |
| Wisconsin                        | X        | X           |        |
| Wyoming                          | X        |             | X      |
| Count                            | 39       | 20          | 17     |
| <b>Canadian Provinces</b>        |          |             |        |
| Alberta                          |          |             |        |
| British Columbia                 | X        |             | X      |
| Manitoba                         |          |             |        |
| New Brunswick                    | X        |             |        |
| Newfoundland and Labrador        |          |             |        |
| Nova Scotia                      | X        |             |        |
| Northwest Territories            |          |             |        |
| Ontario                          |          |             |        |
| Prince Edward Island             |          |             |        |
| Quebec                           |          |             |        |
| Saskatchewan                     |          |             |        |
| Yukon                            |          |             |        |
| Count                            | 3        | 0           | 1      |



## 5.4. LIMITATIONS / DATA DEFICIENCIES

Constantine and Kizer (1988) reported the following difficulties in getting complete and accurate data regarding ferrets:

“Beginning in early 1986, we requested reports of ferret bites and attacks from all California counties and from two adjacent states. Requests for data from more distant states were also made concerning attacks on infants and rabies in ferrets. The medical literature was reviewed, as was literature regarding the habits of ferrets and their polecat progenitors and the existence of feral ferret populations. Early in the investigation it became apparent that some animal control personnel and laboratory workers needed help differentiating ferrets and weasels, whereupon a table summarizing differences was devised and provided to these persons. Other difficulties were experienced gathering and interpreting data. Ferret proponents made widely varying claims about the number of illegal pet ferrets existing in California (ranging from 100,000 to 500,000), and we lacked reliable figures on actual statewide numbers of either captive, stray, or feral ferrets. Owners of illegal ferrets generally were reluctant to report ferret attacks out of fear of prosecution or loss of their animals, and some bitten friends of owners were similarly reluctant. Most biting ferrets appeared to be strays or animals that had escaped or been released after biting their owners. Available reports, which were usually retrospective, generally lacked uniformity, and reflected varying degrees of effort in documenting details of the incident. Spectacular incidents, including those from rabid ferrets or involving infant maulings, seemed more likely to be reported.” (pp. 3-4, Constantine and Kizer 1988).

Our study faced similar challenges in acquiring and interpreting data. There were many confusing articles in the literature that did not, or could not, differentiate ferrets from polecats. We made note of such instances, and chose to cite entire paragraphs rather than interpret the meanings contained within these articles. While administering the agency questionnaire, we found that many of our respondents stated that their agency did not track data on ferrets at all. Thus, we found that there is a general data deficiency on negative interactions between ferrets and the environment (wildlife, agribusiness, or human health).

## 6. TAXONOMY, ORIGIN, AND DISTRIBUTION

### 6.1. TAXONOMY AND NOMENCLATURE

#### 6.1.1. Scientific Nomenclature

The taxonomic treatment of domesticated ferrets has varied greatly over the last three centuries, but most authors prefer the trinomen *Mustela putorius furo*, which is often incorrectly attributed to Linnaeus (1758). Linnaeus (1758) recognized the ferret as its own species *Mustela furo*, a taxon distinct enough, he determined, to separate it from its wild ancestor—the polecat, *Mustela putorius*. Other wild subspecies of *M. putorius* recognized by the USDA (see ITIS 2010) are *anglia* (Pocock 1936), *aureola* (Barrett-Hamilton 1904), *caledoniae* (Tetley 1939), *mosquensis* Heptner 1966, and *rothschildi* Pocock 1932. However, these subspecies are rarely mentioned in the literature. The steppe polecat—*Mustela eversmanii* Lesson 1827—is recognized by most authors as a distinct species, but some treat it as a subspecies of *M. putorius* (e.g. Bachrach 1930). Ferrets and polecats are grouped with martens, weasels, mink, etc. into the subfamily Mustelinae Fischer 1817 and the family Mustelidae Fischer 1817 (Anderson 1989; ITIS 2010).

Dragoon and Honeycutt (1997) concluded that the family Mustelidae was paraphyletic, and proposed to separate skunks and stink badger and erect the family Mephitidae for the genera *Spilogale*, *Mephitis*, etc. Dragoon and Honeycutt (1997) also state:

“The inability to determine monophyletic groups within the Mustelidae has contributed to confusion regarding sister-group relations within the family...The mustelids have been a difficult group to classify, and the Mustelidae is in need of systematic revision.” (pp. 427-428, Dragoon and Honeycutt 1997)

The validity of the taxa *Mustela putorius* and *M. p. furo* has been challenged, and often recombined or misspelled, and synonyms include the following: *Mustela furio* [sic], *Mustela putorinous* [sic]; *Putorius vulgaris*; *Putorius foetidus*, *Putorius furo* (Griffith 1827; Gray 1843; Bachrach 1930; Cabrera 1930; Corbet and Southern 1977; Blandford 1987). Similarly, the vernacular names of *Mustela putorius sensu lato* and its subspecies are quite varied and include: European



polecat, polecat, western polecat, ffwlbart, fitch, fitchet, fitchew, ficht, foulmart, foulmarten, foumart, fitch, iltis (Bachrach 1930; Corbet and Southern 1977); see Thomson (1951) for additional vernacular terminology and etymology. The vernacular names for *M. p. furo* are typically modified from those of the polecat, previously mentioned, such as domestic ferret, domesticated fitch, and European ferret, but the ferret is often synonymized with “polecat” which confuses the differences between genomes of those populations artificially or naturally selected (Bachrach 1930; Anderson 1989). Such synonymy has also made difficult the determination of the adverse impacts that ferrets alone may have caused upon the environment. Some consider the domesticated ferret to be sufficiently divergent from the European polecat and steppe polecat to deserve specific treatment, and many authors use the taxon *Mustela furo* (e.g. Linnaeus 1758; Bachrach 1930; Corbet and Southern 1977; Blandford 1987; Poole 1973). On the other hand, authors such as King (1990) believe elevation of the ferret to the specific level implies greater phylogenetic separation than truly exists between ferrets and polecats. King (1990) also reports that the traditional taxonomic characters (pelage color, cranium measurements) are unreliable in differentiating polecats from ferrets.

The latest genetic analysis of *Mustela* by Davison *et al.* (1999) leaves little hope that the phylogeny of the ferret will be resolved:

“A holarctic species complex? Is it possible to resolve the major relationships within the polecat group (Youngman, 1982)? Perhaps unexpectedly, interspecific variation was generally too low to properly resolve species level relationships. In general, even bootstrap support for the major branches on the *Mustela* tree was poor (Fig. 3a). Variation was greatest between *M. nigripes* and {*M. putorius*, *M. furo*, *M. eversmannii*}, at just over 1% of positions in the cytochrome b gene (Fig. 3a). The mitochondrial results suggest that either polecats and European mink have recently speciated, or else gene flow through hybridization has prevented haplotype divergence, resulting in an unresolved molecular phylogeny. Therefore, the molecular genetics does not resolve whether ferrets were originally domesticated from *M. putorius* or *M. eversmannii*. In Britain, some local populations of polecats may now be most closely related to feral ferrets through hybridization. Furthermore, the degree of nuclear introgression of domestic ferrets and polecats may be so extensive as to rule out ever tracing their wild ancestor.” (p. 160, Davison *et al.* 1999).

Some authors, such as Forsyth *et al.* (2003), describe the combined polecat-ferret taxon (*Mustela putorius sensu lato*) as a spectrum, with the polecat at one end displaying the genotype and phenotype of an un-tame animal able to thrive in the wild and colonize suitable habitat, and the ferret at the other end, displaying the genotype and phenotype of a domesticated animal that cannot thrive in the wild. Domesticity traits may be more attributable to the effects of rearing in captivity and handling by man, rather than whether the animal is genetically closer to a ferret than a polecat (Poole 1962).

Concomitant with the difficulties in differentiating ferrets and polecats genetically are the difficulties in differentiating ferrets and polecats phenotypically. King (1990) reports that the traditional taxonomic characters (pelage color, cranium measurements) are unreliable in differentiating polecats from ferrets. Another author confirms this problem:

“The darkest forms of the Ferret may be indistinguishable externally from the Polecat, but generally the pelage is either albino or like that of the Polecat but lighter, as if the pigment had been partially washed out, and with more extensive white on the face and throat (Walton, 1977). The situation is further complicated by man’s habit of producing ‘fitch ferrets’ or ‘polecat-ferrets’ by crossing true Ferrets with wild Polecats (Lever, 1977; Frazer, 1980). In most parts of Britain the dark form of the domesticated Ferret is even called by the name ‘polecat’, whereas in Wales the name is used for either the wild or domestic animal (Walton, 1970).” (p. 162-163, Blandford 1987)

Ashton and Thomson (1954) attempted to differentiate the different subspecies of *M. putorius* based upon cranial measurements. Other authors have used skull morphology:

“The Scottish Polecat was described by Tetley (1939) from Lochinver, Sutherland (Highland), as having a marked postorbital constriction in the skull, distinguishing it from the straight postorbital region in the English/Welsh form. He also commented on the large size of the skulls, and that the skins did not differ from the those of the English/Welsh form. The diagnostic cranial feature of this form is also the only constant diagnostic feature of the Ferret, *Mustela putorius furo* Linnaeus, 1758, as described by Ashton (1955).” (p. 163, Brandford 1987).

Branford (1987) provides the anatomical data necessary to separate *M. p. putorius* and *M. p. furo*, but states “Absolute separation from Ferrets and Pole-cat Ferrets is difficult for single skulls but can be done with about 95% accuracy.” (p. 163, Brandford 1987).

To complicate matters, He *et al.* (2002) reports that there is significant sexual dimorphism in the ferret skull.

King (1990) summarizes the resulting management problem:

“Since the domesticated ferret *Mustela furo* L. is interfertile with the polecat and as some dark forms of polecat/ferret hybrids are externally indistinguishable from polecats, confusion has occurred in the monitoring of the status and history of the indigenous polecat, particularly since the late nineteenth century.” (p. 11, Howes 1980)

### 6.1.2. State Agency Nomenclature

The Jurek and Ryan (1999) questionnaire summarized state agency nomenclature as follows:

“Nomenclature. Various names are used in state regulations to identify ferrets. Thirty-one (62%) of the states use ‘ferret’, or ‘domestic ferret’, or ‘European ferret’, or a combination of these. Less common terms used by some states are fitch, fitch ferret or European fitch ferret, European polecat, polecat, and *Mustela putorius furo*. No states reported using the terms English ferret or polecat/ferret hybrid.” (p. 9, Jurek and Ryan 1999)

In the CSUS Questionnaire we asked a similar question:

“Which of these terms are used in your State to refer to the domesticated ferret (*Mustela putorius furo*)?”

At least 44 States and several Provinces use the term ‘ferret’ or ‘domestic ferret’ or ‘European ferret’: AK, AL, AR(2)\*, BC(2), CA, CO, CT(2), DC, DE(2), GA, HI, IA(2), ID, IL, IN, KS, KY(2), LA, MA, MD, ME, MI, MN, MO, MT, NB, ND, NE, NH, NJ, NM, NS, NV, NY(2), OH, OK(2), OR, PA, RI, SC, SD(2), TN, VI, VT, WA(3), WI(2), WV, WY(2).

Wyoming and Iowa also use the term ‘polecat’. New York, Wisconsin, and Wyoming also use the term ‘fitch’ or ‘fitch-ferret’. Some States and Provinces also use the trinomen *Mustela putorius furo*: AK, CA, GA, HI, MA, NB, OH, VI, and VT. Michigan uses the binomen *Mustela furo*, and Nevada uses the binomen *Mustela putorius*.

*\*Note: when more than one agency in the same State responded similarly to a question, we noted the tally in parentheses. For example, “AR(2)” indicates that two different Arkansan agency personnel responded, and both indicated that the term “ferret” was used in their State.*

(data compiled from CSUS questionnaire responses; Appendix C).

### 6.1.3. Summary and Opinion

The taxonomy of the genus *Mustela*, and even the family Mustelidae, is not well defined taxonomically. The genus *Mustela* is considered a holarctic species complex that may not be able to be resolved because of hybridization. Reproductive isolation apparently is not a distinguishing character, as the polecat, steppe-polecat, ferret, and black-footed ferret can interbreed. The taxon *Mustela putorius sensu lato* is considered a spectrum, with the polecat at one end displaying the genotype and phenotype of an un-tame animal able to thrive in the wild and colonize suitable habitat, and the ferret at the other end, displaying the genotype and phenotype of a domesticated animal that cannot thrive in the wild. Cranial measurements (post-mortem) are the only reliable way to differentiate polecats from ferrets that are caught in the wild. The unresolved taxonomy and difficulties in identification may pose a challenge to the regulation of ferret importation.

## 6.2. ORIGIN AND DISTRIBUTION

### 6.2.1. Origins of the Ferret

The subfamily Mustelinae probably originated in Eurasia (Anderson 1989). The native range of the subgenus *Putorius* is Eurasia, except for the black-footed ferret (*M. nigripes*), which is limited to the Great Plains ecoregion of North America (Anderson 1989). Some authors, including Linnaeus (1758), report the polecat's native range as Africa, or specifically Egypt, or in the case of Cabrera (1930), Morocco; other authors, such as Lewington (2007) refute this claim. Wild *Putorius* typically inhabit steppes, prairies, meadows, and open forest (Anderson 1989). Branford (1987) provides a detailed description of the distribution and preferred habitats of *M. putorius sensu lato*.

The domesticated ferret is often cited as having been selectively bred in captivity for over 2 millennia, but its origin is not clear (Thomson 1951; Fox 1988; Anderson 1989). Corbet and Southern (1977) explain:

“Ferret. *Mustela furo* Linnaeus 1758. Taxonomic status: A domesticated form of rather complex status. It has been bred since Roman times at least (mentioned by Strabo in the first century B.C.). It is derived either from the polecat, *M. putorius*, with which it is fully interfertile, or from the steppe polecat, *M. eversmanni*, which it resembles most closely in the form of the skull. These two wild forms have been considered conspecific, but current opinion in eastern Europe and Russia, where their ranges appear to overlap, is that they are good species. In view of this uncertainty it is best to treat the domesticated ferret provisionally as if it were a distinct species. The situation is further complicated by the habit of producing ‘fitch ferrets’ or ‘polecat ferrets’ by crossing true ferrets with wild polecats.” (Corbet and Southern 1977, p. 352)

The earliest references to a domesticated ferret may be by Aristotle in the fourth century B.C.E. or possibly in Palestine circa 1,000 B.C.E. (Thomson 1951; Zeuner 1963; Blandford 1987). Authors such as Boyce *et al.* (2001) suggests a different, earlier origin in Africa:

“The domestic ferret is believed by many to have been first domesticated about 3000 years ago by the ancient Egyptians.” (p. 693, Boyce *et al.* 2001).

These authors do not convincingly prove that these early references refer specifically to ferrets, and not to polecats, weasels, or other mustelids common to the region in question; furthermore, interpretations were made in the translations from the original languages (see review by Owens 1969). There is also little evidence to suggest that the purpose of selective breeding was to produce a pet, rather than a hunting companion, as many early references indicate their use to hunt rabbits.

There are references to ferrets in Britain as early as the thirteenth century C.E. (Lever 1985). Most published sources agree that the ferret was derived from *M. putorius sensu lato* or *M. eversmanni* or their hybrids (Miller 1933; Blandford 1987; Owens 1969). The ferret is apparently interfertile with *M. p. putorius* and *M. eversmanni* (e.g. Corbet and Southern 1977). Fox (1988, p. 6) reports that, “the female ferret and male stoat (*Mustela erminea*) will also produce fertile hybrids.” The black-footed ferret (*M. nigripes*) is apparently interfertile with *M. eversmanni*, and may be descended from it (Chadwick 1991). Davison *et al.* (1999) suggest that the genetic differences between *M. nigripes* and *M. eversmanni* may be intraspecific. Davison *et al.* (1999) have recently attempted to study the ferret genome, and report the following:

“Domesticated polecats or ferrets (*Mustela furo*) have been recorded in association with humans since the fourth century BC when Aristotle described them in a treatise on animals and physiognomy (Thomson, 1951). The Old Testament also ordained that they are one of the unclean animals (Lev. XI. 29 and 30; Thomson, 1951) and Strabo (63 BC-24 AD) reported that ‘Libyan’ ferrets were used to rid the Balearic Islands of a plague of rabbits (Thomson, 1951; Blandford, 1987). However, except for recent speculation regarding their origin (Zeuner, 1963; Blandford, 1987 and references therein), and some biological studies on their morphology and karyotype (Frykman, 1972; Grafodatskii *et al.*, 1982; Wang *et al.*, 1984), almost no progress has been made in uncovering the centre of their domestication. Even the parent species of domestic ferrets are uncertain. They may have been domesticated from the European polecat (*M. putorius*), or from its eastern congener, the steppe polecat (*M. eversmanni*), which has a superficially more similar cranial morphology (Blandford, 1987). Since *M. putorius* and *M. eversmanni* are occasionally reported to hybridize where they overlap in their distribution, the reality of a true species split has been debated (Blandford, 1987), and several authors have at least considered whether *M.*

*putorius*, *M. eversmannii*, and the endangered *M. nigripes* from North America (black-footed ferret) could be viewed as one Holarctic species (Anderson, 1977; Anderson et al., 1986; O'Brien et al., 1989). Black-footed ferrets and polecats produce fertile hybrids in captivity..." (pp. 155-156, Davison *et al.* 1999).

Ferrets are often cited as derived from an albinistic polecat, such as these excerpts:

"The ferret of England and America, variously called *Putorius vulgaris*, *P. foetidus vulgaris*, or *Mustela putorius*, is believed by some authors to be a domesticated variety or albino mutant of the wild polecat, *Putorius foetidus*, or northern and central Europe...the tame ferret and its wild relative interbreed freely, and the hybrids are believed to give the color varieties appearing even in the same litter with white kits." (p. 234, Bissonnette 1950).

"Ferrets are the albino domesticated form of the polecat." (p. 136, Hvass 1961)

"The ferret, *Mustela putorius furo* L., is an albinotic, domesticated form of the polecat." (p.244, Kowalski 1976)

"The polecat-ferret is, as its name implies, a cross between the wild (European) polecat and domestic ferret. There has been—and indeed still is—much controversy among systematists over the origin of the domestic ferret; all agree that it is a domesticated albino descendant of the polecat, but whether its ancestor is *M. putorius* (with which it is fully infertile) or the (Asiatic) steppe polecat (*M. eversmanni*) remains uncertain. These two wild forms have been regarded in the past as conspecific, but current opinion in eastern Europe and Russia, where they appear to be sympatric, is that they are separate species." (Lever 1985, p. 60)

"The ferret . . . is the product of selective breeding of albino polecats, white animals being chosen due to their visibility in the twilight when used to catch or flush rabbits." (p. 11, Howes 1980)

The majority of the literature reviewed does not support the contention of Lever (1985) and others that the domesticated ferret derived from an albinistic polecat. Example text is provided:

"The ferret has long been thought to be an albino variety of the European fitch. This is probably not true. In the first place the ferret is not an albino." (p. 308, Hagedoorn 1954)

"The original ferret was undoubtedly the color of a wild polecat and we do not know at what period the break to white occurred." (p. 491, Owen 1969)

The latest genetic analysis of *Mustela* (Davison *et al.* 1999) demonstrates that the ferret's origins are obscure and complex. But albinism is apparently common in ferrets:

"A litter of 7 wild caught polecats was also used in the experiment...Subsequently on mating a pair of the some of the offspring proved to be albinos. This indicated that they were hybrids rather than pure bred European polecats, for the albino gene is rare in the wild polecat populations whilst it is common amongst domesticated ferrets." (p. 27, Poole 1972).

The modern pet ferret genome displays a range of colorations and markings, and the American Ferret Association Standards include at least 7 colors and 6 patterns (Schilling 2007).

One of the primary uses of ferrets was as a hunting companion, where the ferret would flush out, or "ferret out", prey from holes or other refugia (Everitt 1897; The New Hunter's Encyclopedia 1966; Woodford 1967). White-phase and/or albino ferrets may have been more desirable because they were not mistaken for prey during hunting and were easier to spot in brush. White ferrets were often used in falconry so that the trained hunting hawks do not mistake the ferret for wild prey that have non-white coats (Woodford 1967). The account of ferreting by Glasier (1982) is another example:

"When rabbits are not lying about, you can go ferreting with your hawk. If you have white ferrets, and not the polecat variety, and get the hawk used to them in advance by having their hutch and run in her view, she will not try to catch them when out hunting." (Glasier 1982, p. 171)

Mannix (1967) similarly explains the use of the white-phase, or albinistic, ferret:



“There are two types of ferrets: the brown with black markings, called a ‘fitch,’ and the albino variety, called the ‘English ferret.’ The English ferret was developed so that ratting terriers could more readily distinguish the ferrets from the rats. The two types interbreed freely, and the young are either pure white or fitch, never piebald.” (p. 93, Mannix 1967)

There are various authors that maintain that ferrets have only recently been domesticated; some excerpts are provided:

“Ferrets are claimed to have been domesticated for over two thousand years[Footnote 1], and have been used as aids in hunting, especially rabbits.

[Footnote 1] = Wildlife Biologist Ronald Jurek, of the California Department of Fish and Game, disputes this assertion, and believes that the ferret has been domesticated for a far shorter period. (Personal communication, April 25, 1997).” (pp. 1, 8, Umbach 1997)

“The ferret has long been considered to be a domesticated fitch (polecat). It is true that the skull of the present ferret closely resembles that of the fitch, but this resemblance may have been due to cross-breeding with the fitch after the ferret was established as a domestic breed. From experience with the cage-bred fitch it seems to me almost impossible to believe that anybody would ever have thought of domesticating this animal. Even quite tame fitches are so quick and bold and snappy that the idea of going ferreting with a fitch sounds like going hunting with a pet tiger. It is probable that the original ferret was a domesticated Siberian fitch, a species that can readily be tamed and has a much quieter and more amiable disposition than our local black fitch.” (p. 54, Hagedoorn 1954)

“We cannot say that domestic animals are different from wild animals in that they are tame, for there exists domestic animals that are not any tamer than their wild-living relatives. There is only one definition that fits all domesticated animals, and it is the same that fits all cultivated plants. The races of cultivated organisms are fitted to live in symbiosis with mankind. They differ from related wild species and from the wild species from which they are descended, in their inherited make-up, in some way which makes them useful to man, and sometimes also dependent upon man.” (p. 57, Hagedoorn 1954).

The crux of the argument is that the domesticated form (*M. p. furo*) has been repeatedly crossed with the wild form (*M. p. putorius*) in selective breeding programs, especially in the United Kingdom. Here are some examples from the literature:

“Although ferrets have been selectively bred over the centuries, one should not presume that man’s development of ferrets from polecats means that the ferret has undergone isolation from and differentiation from polecats for thousands of years. On the contrary, ferret breeders have periodically crossed ferrets with polecats to produce the polecat-ferret or fitch-ferret coat color pattern (Fennell, 1841; Matthews, 1968; Corbet and Southern, 1977).” (p. 16, Constantine and Kizer)

“By hybridizing ferret and European fitch, beautiful first-generation hybrids are produced, having food requirements somewhat less strict than in the wild species, and very valuable pelts. These hybrids were less susceptible to distemper than fitches, but seemed more susceptible than ferrets.” (p. 309, Hagedoorn 1954)

“With a few animals there is the possibility of utilizing a domestic animal to ameliorate a wild fur-bearer. The fitch will readily cross with the domestic ferret, and the hybrids are fully fertile. From such hybrids I have produced a few animals that were as tame as ferrets, and that did not need a more elaborate diet than ferrets, but that had as beautiful a pelt as the wild dark fitch.” (p. 310, Hagedoorn 1954)

“That the Ferret, in its natural condition, possesses habits nearly similar to the Polecat, is clearly indicated by its great resemblance in point of structure and form. But in this climate it exists only in a state of domestication; indeed its true natural colour and appearance are so little known, that, up to the present day, it is considered by many as being merely a variety of the Polecat. In support of this opinion, it is urged that they will readily breed together; and it has often been stated that the breeders of Ferrets will improve the race by the admixture of the other animal.” (p. 162, Bell 1837)

“The subject of ferret hybrids is a hotly debated topic in many ferret circles. Very simply put, a hybrid is a cross between a domestic animal and its wild counterpart—in this case, a ferret and a polecat...You must examine what it is that makes people attracted to the ferret hybrid in the first place....Some argue that if done responsibly and correctly, hybrid breeding can enhance existing ferret bloodlines and make ferrets healthier, hardier, and sounder by introducing polecat blood into the mix.” (p. 27, Schilling 2007)

Lewington (1988) gives a comparison of ages of domestication of the following pets: dog—10,000 years; cat—5,000 years, and ferret—2,000 years.

There is also a minority view in the literature that ferrets are not truly domesticated at all, or should not be considered domesticated, because of their unprovoked attacks upon humans and other non-domesticated, or non-companion, behavior such as cannibalism of their own kits. Bell (1837), for example, suggests that simply the smell of blood will cause a (domesticated) ferret to revert to a “savage” state similar to a polecat. Harding (1915) gives contradictory statements on the tameness of ferrets:

“They [ferrets] are capable of only partial domestication, acquiring a kind of familiarity with man and submitting with perfect quietness to his handling, but apparently never forming any very decided attachment, and they never cease to be dangerous if not carefully watched, especially where infants are within their reach.” (p. 18, Harding 1915).

“Ferrets that are handled a great deal generally become quite tame. The animal is possessed of more intelligence than usually known. Those kept and handled for months are apt to become so tame that they will not leave even when given freedom but are on hand at feeding time. In several instances ferrets and cats have been known to eat from the same dish. Others become so attached to their owner, that they are at his heels much of the time, when he is around the premises...All know how a dog becomes attached to his master. It seems ferrets have same fondness, at least to some extent.” (pp. 22-24, Harding 1915)

Some authors, including Bell (1837), claim that this interplay of wildness and tameness make the ferret an excellent hunting companion:

“This combination of docility and ferocity has, however, rendered the Ferret subservient to the use of man, by enabling him to employ the animal with great advantage in the capture of Rabbits, and in the destruction of Rats and other vermin.” (p. 164, Bell 1837).

Hitchcock (1994) also considers the ferret to be non-domesticated:

“The European ferret, conspecific with the European polecat, *Mustela putorius*, is not a domesticated animal even though it has been captive bred by man since at least Roman times. It has been selectively bred to be an intelligent, efficient, effective and vicious killer, trained to ‘ferret out’ and quickly dispatch rodents and rabbits and to respond to the commands of the ‘handler’ (an adult human). Some were also captive bred for fur, and both the animal and the fur were called ‘fitch.’ Intraspecific crosses have occurred between both of the selectively bred strains and have backcrossed as well with parent stock under both captive and ‘wild’ conditions throughout this period. Apparent docility toward the ‘handler’ was also selected for in those utilized in ‘ferreting.’ European ferrets are quite playful, ‘cute’ and like to be held, but until recently were certainly not considered desirable pets.” (p. 207, Hitchcock 1994)

Schilling (2007) argues that ferrets fit the criteria requisite for domestication:

“Yes, Ferrets are Domesticated. Domestication is a long process in which people selectively breed wild animals in captivity for human benefit. There are three main criteria for domestication: Humans select the animal to be bred...The animal experiences some type of genetic change that reflects the human selection and distinguishes it from its wild counterparts...Humans derive some benefit from the domestication of the animal.” (pp. 22-23, Schilling 2007)

Kowalski (1976) wrote an entire book on the domestication of mammals; some pertinent excerpts are provided:



“From a zoological standpoint domestication is a specific phenomenon close to symbiosis: it enables the two parties, i.e. the domestic species and man, to conquer new environments and enlarge the population. There is no strict borderline between domestic and wild animals. It is well-known that many domesticated animals easily run wild and in suitable habitats are able to exist and reproduce without man’s care...At the same time many species of fur-bearing mammals, usually not included in the group of domestic animals, have been raised for many generations and their new breeds have been obtained. Domesticated mammal species are generally social in natural conditions. Perhaps their ability to submit the leader of a herd has facilitated their submission to man.” (p.238, Kowalski 1976)

“The domestication of mammals has been the greatest and longest experiment carried out by man on animals. It should be stressed, however, that in spite of the great morphological variability of domestic species, man has not succeeded in obtaining even a single new species of mammals. This great variability of animals which observed in breeding is of infraspecific character. Each species of domestic animal derives from one wild species, and the changes to which it was submitted have not reached the level of specific differentiation. Domestic forms zoologically belong to the same species as their wild ancestors although often for the sake of convenience a separate Latin species name is given to them.” (pp. 239-240, Kowalski 1976)

Poole (1962) reports on behavioral differences between polecats and ferrets and the effects of rearing in captivity.

### **6.2.2. Introduction into North America**

Ferrets are often reported as being first imported into the USA from Europe in the late 19<sup>th</sup> century for use in hunting and pest control. Harding (1915) states that ferrets were first brought to USA from Spain circa 1875. European ferrets were originally imported into the US around 1875 and used primarily for ratting, according to Dolensek and Burn (1976). Fox (1988) reports their use in fur production in the early 1900’s. Mannix (1967) gives detailed accounts of the use of ferrets in America for rodent control and rabbit hunting. Bissonnette (1950) describes similar uses of ferrets:

“Tame ferrets raised in America were probably introduced from Europe, where they have been used in hunting rabbits and rats, and for taking ropes through long underground pipes.” (p. 234, Bissonnette 1950)

Some authors report that the ferret was introduced into North America much earlier, such as the following example:

“The domesticated ferret, although introduced to North America by the early English settlers some 300 years ago, has not established feral colonies on this continent.” (p. 6, Fox 1988).

Harding (1915) states that the ferret breeding industry started in northern Ohio in a town nicknamed “Ferretville”, where annual shipments averaged 20,000 ferrets, and may have peaked at 35,000 ferrets per year. Harding (1915) recounts:

“The ferret business in America was first launched by Henry Farnsworth, at Rochester, a little village of some 200 inhabitants, a few miles northeast of New London. Realizing a few years later that it could be developed into quite an industry, with his three sons, Levi, Samuel and Ezra, they moved the business to near New London, where the breeding and raising was carried on, on a more extensive scale, raising and selling several hundred if not thousands yearly for some time...New London became and still is the center of the industry. Within a radius of ten miles of New London, half of the ferrets in America are probably raised. New London (Ferretville) is pretty well advertised throughout America as the village where ferrets are raised by thousands. While the industry is one where the demand will probably remain under 200,000 yearly for rat and rabbit purposes, yet as the tens of thousands sold annually go to all parts of America, it puts Ferretville upon the map, so to speak, far and wide.” (pp. 25-27, Harding 1915)

Harding (1915) provided excerpts from the United States Department of Agriculture Bulletin 369 entitled “How to Destroy Rats” by David Lantz, including the following:

“Among domestic animals employed to kill rats are the dog, cat and ferret...Tame ferrets, like weasels, are inveterate foes of rats, and can follow the rodents into their retreats. Under favorable circumstances they are useful aids to the rat catcher, but their value is greatly overestimated. For effective work they require experienced handling and the additional services of a dog or two...Sometimes they remain for hours in the burrows or escape

by other exits and are lost. There is a danger that these lost ferrets may adapt themselves to wild conditions and become a pest by preying upon poultry and birds.” (p. 91, Harding 1915)

According to Kowalski (1976), cats gradually replaced ferrets as the popular animal companion for rodent control. Harding (1915) recounts how ferrets were used in western USA at the beginning of the 20<sup>th</sup> century by farmers and ranchers to eradicate squirrels, prairie dogs, and gophers. Mannix (1967) gives another example of the early use of ferrets in USA:

“According to a beloved American tradition, every boy should have a dog. Judging from English literature of the last century, a dog was considered an unnecessary luxury for youngsters, but every boy had a ferret...Although most accounts descriptions of rural life in England contain references to ferrets, I know of no account of their use in America. Yet ferrets were employed in this country on a scale unheard of in Europe, and were even used against such formidable quarry as raccoons, mink, muskrats, and foxes.” (p. 90, Mannix 1967)

The survey of North American state agencies conducted for this study provided some additional information on the introduction of ferrets into USA. The survey requested an answer to “The domesticated ferret was first introduced / imported into my State in year:\_\_\_.” or an estimate therein. Several eastern States answered with distant dates of introduction: Virginia and Massachusetts estimated in the “1700’s”; Iowa in the “1800’s”; New York and Ohio estimated 1900. Other States reported more recent introductions: Minnesota and Montana in 1950; New Mexico and Oklahoma in the 1960s; Washington District of Columbia, Kentucky, North Dakota, in the 1970s; Alaska, Connecticut, Indianan, Maine, and Washington State in the 1980s; Michigan, Rhode Island, and West Virginia in the 1990s. These responses are consistent with the literature that documents two phases of introductions of ferrets into USA: an early, utilitarian phase spanning from the late 18<sup>th</sup> century to the end of the 20<sup>th</sup> century; and a recent phase spanning the decades from 1970 to 1990, corresponding to the recent popularity of the ferret as a household pet. Some authors describe this recent increase as a “fad” (Williams 1984) and attribute the ferret’s popularity to its repeated appearance in cinema during the same time period: see Schilling (2007) for examples. The ferret’s success as a pet may also be due to the creation of effective vaccines for the ferret. The increase in popularity of the ferret as a pet may have recently slowed or diminished, as the American Pet Products Association, Inc. (2010) reports that the percentage of small animal ownership per total USA households has not significantly changed since 1988, the year of their first nationwide survey, and ferrets represent only 8% of this small animal ownership.

Neither ferrets nor polecats are listed in the following regional mammal checklists:

- South America (Lord 2007)
- North America (Whitaker Jr. 1980; Hall 1981)
- Canada (Banfield 1974; Van Zyll de Jong 1983)
- Neotropics (Eisenberg 1989)
- Virgin Islands & Puerto Rico (Philibosian and Yntema 1977)
- Southwest USA (Cockrum 1982)
- Northwest USA (Ingles 1965; Larrison 1976)
- Arkansas (Sealander 1979); Hawai’i (Tomich 1986); New Mexico (Findley *et al.* 1975); Oklahoma (Caire *et al.* 1989); Oregon (Verts and Carraway 1998); Washington (Dalquest 1948; Larrison 1970)

Ferrets are mentioned in the *Introduced, Nonnative Mammals* section in the Arizona state checklist by Hoffmeister (1986); this is discussed later in this report as a case study.

### 6.2.3. Distribution of Mustelids in California

Mustelids may have arrived in what is now California as early as the Miocene Epoch (Jameson and Peters 2004). Eleven mustelid species are native to California: sea otter (*Enhydra lutris*), distributed along the entire coast of California; wolverine (*Gulo gulo*), distributed in the high Sierra Nevada and Klamath Mountains; River otter (*Lutra* [= *Lontra*] *canadensis*), distributed in the Cascades and Sierras and Central Valley; marten (*Martes americana*), distributed in the Cascades and Sierras; fisher (*Martes pennanti*), distributed in the Cascades and Sierras; skunks (*Mephitis mephitis* and *Spilogale putorius*), distributed statewide except for the southeastern deserts; ermine (*Mustela erminea*) and long-tailed weasel (*M. frenata*), both distributed in the northern half of California and in the coastal ranges; mink (*M. vison*),

distributed in Central Valley and northern half of California; and badger (*Taxidea taxus*), distributed in the Great Basin region and occasionally Central Valley (Jameson and Peeters 2004).

Note, however, that most mammalogists have separated and elevated skunk species to their own family Mephitidae (Dragoon and Honeycutt 1997; ITIS 2010).

The following authors do not list any exotic mustelids in their inventories or checklists of California mammals: Stephens (1906), Ingles (1947), Williams (1979), Laudenslayer and Grenfell (1983), Laudenslayer *et al.* (1991), Trapp (1992), and Jameson and Peeters (2004). Ferrets and polecats are not mentioned in the *Complete list of Amphibian, Reptile, Bird and Mammal species in California* compiled by CDFG (2008). Jurek (2001) does not list ferret or polecat as an established mammal in California. Mooney *et al.* (1986) do not list the ferret or polecat in their list of invasive and naturalized mammals present in California.

#### **6.2.4. Summary and Opinion**

The literature suggests that for several thousand years, humans have captively and selectively bred polecats to produce domesticated varieties, called ferret, that served as hunting companions, pets, or for rodent control. Since ferrets are often back-bred with polecats, each ferret lineage may be relatively ancient or modern, and may fall anywhere within the polecat-ferret spectrum in terms of its behavior and fitness. The great majority of the published literature does not consider the ferret or polecat to be an established wild mammal in North America.

## **7. CENSUSING FERRETS**

### **7.1. WHY IS THE CENSUS OF FERRETS IMPORTANT?**

The census of ferrets existing in California, and in the USA in general, is important for several reasons, such as:

- provides important information about potential economic impacts, both beneficial and adverse
- may support pro-ferret arguments or anti-ferret arguments that ferrets do or do not impact the environment
- may be used in risk analyses and cost-benefit analyses
- measure of civil disobedience (*i.e.* number of Californians ignoring the ferret regulations) and relative need for future licensing, monitoring, or enforcement actions

### **7.2. ESTIMATES FROM PUBLISHED LITERATURE**

Estimates for total numbers of pet ferrets in the USA for the last decades of the 20<sup>th</sup> century range from 275,000 to 10,000,000. Estimates for total numbers of pet ferrets in California for the last decades of the 20<sup>th</sup> century range from 30,000 to 1,000,000. Not surprisingly, pro-ferret groups tend to give estimates in the upper range, and anti-ferret groups tend to give estimates in the lower range. Many published estimates are cross-citations or re-citations: veterinarians such as Boyce *et al.* (2001) often cite ferret organizations as the source for their population estimates. No published source explained their estimate method or accuracy; in general, empirical data are lacking to back any census or population estimate.

Veterinarian S. Diesch estimated that in 1988, 50,000 ferrets were sold yearly in the United States and 1 million were kept as pets (Paisley and Lauer 1988). Another veterinarian estimated that there were “several million” in the USA (Ball 2002). Nowak (1999) estimated that 1 million pet ferrets are kept in USA; Jeans (1994) estimated 7 million domestic ferrets in US households in 1994. Weisser (1991), citing pro-ferret organizations, estimated 5 to 6 million in USA, and 250,000 to 100,000 in California. Other estimates are provided in the following text copied verbatim:

Legislators reviewing bill that would eliminate the euthanization procedure when ferrets bite someone in New Hampshire. Representative Robert L’Heureux (R-Merrimack) says that there are about 30,000 pet ferrets in the state and if the new legislation passes, the inoculations could save the lives of many ferrets. Anonymous. 1995. Rabies bill filed on ferrets in N.H. Boston Globe. Boston, Massachusetts, February 16, 1995, pg. 40.

“Ferrets are permitted as pets in all states of the continental U.S. except California, and some observers estimate that there are from 100,000 to 500,000 domestic ferrets kept as pets in California despite the prohibition. A Michigan official noted that Michigan went from zero ferrets (officially, as they were prohibited) to 200,000 overnight when they were legalized a few years ago, and ‘they did not all just come in over the state line that day.’<sup>2</sup>

<sup>2</sup> Dr. Stephen Halstead, head of the Companion Animal Program, within the Division of Animal Industry, personal communication, April 4, 1997.” (pages 1-2, Umbach 1997)

“Despite restrictions on their sale, there are an estimated five to seven million pet ferrets in this country.” (p. 223, Nagami 2004).

“The commercial production of ferrets on a large scale in the 1930s resulted from a demand by the scientific community to provide a model for vaccine testing and biomedical research in the fields of reproductive physiology, virology, toxicology, and cardiovascular pharmacology. Over the last 5 years, 6,000 ferrets sold annually.” (AVMA 1986; Besch-Williford 1987)

“Current estimates place the number of domestic ferrets kept as pets at between five and eight million animals with several million more being used as research subjects.” [citing Matulich, E. 2000. Ferret domesticity: a primer. Ferrets USA, pp. 88-95. (p. 698, Boyce *et al.* 2001)

There have been attempts to estimate ferret population by inventorying pet products and extrapolating to numbers of pets:

“Wright says the nation's leading pet industry association reports 27% of ferret supplies sold in the United States are sold in California.” (Tone 2007)

“Estimates by ferret breeders and experts place annual sales of the pets at 20,000 to 30,000.” (p. 59, Williams 1984)

“Despite their illegal status, between 100,000 and 500,000 domestic ferrets are estimated to live California. The commercial pet industry estimates that more than a quarter of U.S. sales of ferret food and supplies are sold in California.” (Ferrets Anonymous 2010)

Several authors suggest that the population of ferrets in USA is increasing:

“The population of pet ferrets is estimated to have grown to two million from 100,000 in 10 years.” (Copping 2008)

“Another indicator of popularity is that the number of ferrets confiscated at California’s border agricultural check stations has increased through the years from none in 1975 to 210 in 1985-1986, according to state agricultural officials. The total exceeded 200 in 1986-1987 before dropping to the 150 level in 1988-1989. Seized ferrets can be returned to the place of origin, exported to an out-of-state facility that accepts ferrets or may be euthanized, according to Capt. Simon of the DFG.” (p. 7, Weisser 1991).

However, the American Pet Products Association, Inc. (2010) reports that the percentage of small animal ownership per total USA households has not significantly changed since 1988, the year of their first nationwide survey.

Jurek (1998) reviewed the literature from both pro-ferret organizations and National Pet Ownership Surveys to try to arrive at an accurate census of ferrets, and gave the following information and summaries:

“In California, fewer than 1,000 ferrets are possessed under State permits by university and medical research facilities and by animal exhibitors. The Department of Fish and Game has made no attempt to estimate the number of illegal ferrets kept as pets and has had no information upon which to calculate a reasonable estimate. Also, no other California agency has made an assessment. During the past 15 years, however, advocates for legalizing ferrets as pets have routinely claimed that hundreds of thousands of California citizens own hundreds of thousands of ferrets. A reasonable estimate of the number of illegal ferrets and owners in California would be



useful to agencies and the public in assessing proposed ferret legalization, including evaluating pros and cons of ferret licensing and assessing risks to public health, animal welfare, agriculture, and wildlife.” (p. 1, Jurek 1998)

“Thus, claims by ferret organizations of the number of ferrets existing in the U.S. in the late 1980s were consistently in the range of 5 or 6 million ferrets, which expanded during the 1990s to 7 to 10 million. Ferret organization claims of the number of pet ferrets in the U.S. are not supported by data reported in the major national pet surveys. The nationwide number of pet ferrets reported in one recent, professionally conducted pet ownership survey is only 10 to 20 percent of the numbers claimed in the mid 1990s by ferret organizations.

The American Veterinary Medical Association (AVMA) sponsored its nationwide survey of pet ownership in 1991 and in 1996 (Gehrke, 1997)...The AVMA reported that the number of ferrets in the U.S. was 275,000 in 1991 and 791,000 in 1996 (Figure 1). The rate of ownership (percentage of households owning ferrets) increased from 0.2% in 1991 to 0.4% in 1996, with the number of ferret-owning households increasing from 189,000 in 1991 to 395,000 in 1996.

The American Pet Products Manufacturers Association (APPMA), representing pet supply manufacturers and importers, have conducted National Pet Owners Surveys since 1988. Although the APPMA survey sample size is smaller than the AVMA survey, the APPMA surveys more frequently, every two years, compared with AVMA surveys at four-to-five-year intervals. APPMA’s survey in early 1996 indicated that ferrets were owned in about 6% of the 5 million households owning small animal pets, excluding cats and dogs (APPMA, 1996). Thus, approximately 300,000 households nationwide owned ferrets, a significant increase since APPMA’s 1992 survey. The number of ferret-owning households was about the same as gerbil-owning households. More households owned, in decreasing order, rabbits, hamsters, and guinea pigs. In each of these respects, the APPMA survey results were quite similar to those of the AVMA.” (pp. 3-4, Jurek 1998)

Ferrets are illegal for pet keeping in California and Hawai’i. Also, in other states where ferret keeping is generally allowed, many cities and counties restrict or prohibit ferrets. Underestimations of ferret numbers in the two nationwide pet surveys could arise if significant numbers of survey participants who owned ferrets in areas where they are illegal chose not to report having them. U.S. residents living in areas where this animal is prohibited may represent 15% or more of the nation’s population (Californians represent 12% of the U.S. population). NFO Research, Inc., the survey organization for both the APPMA and AVMA, assures its survey participants that their responses, whatever the topic in its wide array of consumer-related subjects, are kept in confidence. There is no reason to assume that the AVMA data underrepresent ferret numbers (see [http://www.nfor.com/nforesearch.nr\\_white\\_papers.html](http://www.nfor.com/nforesearch.nr_white_papers.html)), but even if one would want to surmise a 20% or 25% underestimate, there still would be fewer than one million pet ferrets in the nation, based on the 1996 AVMA figures.” (p. 7, Jurek 1998)

“However, the proportion of households owning ferrets in California and the per capita number of ferrets are likely to be lower than elsewhere in the nation, because the California prohibition makes it much more difficult for one to purchase or import ferrets than in other states. Also, it is relatively more difficult than in other states to obtain medical attention for ferrets, and any abandoned, stray, and confiscated ferrets suitable for adoption would be sent out of California.” (p. 10, Jurek 1998)

Jurek (1998)’s conclusion is reproduced verbatim here:

“Until better data become available directly from California studies, the only reasonable way to quantify the illegal ferret population in California is to acknowledge that no accurate assessment is possible. However, based on available 1996 national ferret ownership rates and pet population data, there would likely be fewer than, perhaps far fewer than, 100,000 pet ferrets in California.” (p. 10, Jurek 1998)

We agree with Jurek (1998)’s statement that, “*There are no data comparing the ownership rate in California with the national rate.*”

### 7.3. ESTIMATES FROM SURVEYED AGENCY PERSONNEL

Jurek and Ryan (1999) asked their respondents to tabulate the number of legally-possessed ferrets in their State; the results are copied verbatim here:

“Estimated Number of Legally Possessed Ferrets. Forty states (80%) indicated that the number of legally possessed ferrets was ‘Unknown’, or they gave no response, or listed as not applicable. Hawai’i listed the number as zero, and nine states estimated or listed totals ranging from 150 to over 20,000. Fourteen states indicated that there were no legal hunting ferrets (Appendix B-6). The nine states that estimated populations of legal ferrets gave the following numbers, according to categories of use (a question mark listed below means that ‘?’ was part of the answer used by respondent on the form. An asterisk (\*) indicates that more detailed information is given in Appendix B-6):

| State         | Total   | Pets                   | Breeding Stock | Lab Animals | Hunting Ferrets |
|---------------|---------|------------------------|----------------|-------------|-----------------|
| Alaska        | 300     | 300                    | ?              | ?           | 0               |
| Arizona       | 10,000* | 9,500?                 | 500?           | ?           | 0               |
| California    | < 500   | 0                      | 0              | < 500       | 0               |
| Illinois      |         | > 671*                 | unknown*       | prob. < 100 | prob. 0         |
| Kentucky      | 150     | 35*                    | 25*            | 0           | 0               |
| Massachusetts | ~2,000* | ~2,000*                | 0*             | 100-200     | 0               |
| New Jersey    |         | 20,000*                | unknown        | 2,000       | 0               |
| New York      |         | -----6,000*-----       |                |             |                 |
| Rhode Island  |         | pets: several thousand |                |             |                 |

(p. 9, Jurek and Ryan 1999)

Unfortunately, Jurek and Ryan (1999) did not ask their respondents to estimate the total number of ferrets in their State, both legally and illegally possessed. As well, many respondents did not have any empirical data to answer the question, and decided not to provide any answer all.

In our study, this survey question was modified and made more general: “*Please estimate the total number of domesticated ferrets in your State*”. It was anticipated that many respondents would lack empirical data to give a specific numerical estimate, so an additional response choice was offered: “*Can’t say precisely, but my professional estimate of the range of domesticated ferrets that exist in my State is: 1 to 1,000 ferrets; 1,000 to 10,000; 10,000 to 100,000; greater than 100,000*”. No State agency respondent gave a firm estimate or census of ferrets in their State based upon empirical data. However, most State agency biologists were comfortable with estimating the pet ferret population in their State to the nearest order of magnitude. The results are as follows:

| Can’t say precisely, but my professional estimate of the range of domesticated ferrets that exist in my State is: |                                            |                                                           |                                                                                      |                        |         |
|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------|---------|
| State Response                                                                                                    | Don’t Know                                 | Est. 1 to 1,000                                           | Est. 1,000 to 10,000                                                                 | Est. 10,000 to 100,000 | Totals  |
|                                                                                                                   | ID, IL, LA, NC, NE, NJ, NV, OH, OR, TX, UT | AK, DC, DE, HI, IA(2)*, KY, OK, MT, NY, SD, WA, WV, WY(2) | AL, AZ, CO, CT(2), GA, MA, MD, ME, MI, MS, ND, NJ, NM, OK, PA, SC, VI, VT, WA(2), WI | CA, IN, MN, NY         |         |
| Lower Bound                                                                                                       | 0                                          | 13 x 1                                                    | 20 x 1,000                                                                           | 4 x 10,000             | 60,013  |
| Upper Bound                                                                                                       | 0                                          | 13 x 1,000                                                | 20 x 10,000                                                                          | 4 x 100,000            | 613,000 |

*\*Note: when more than one agency in the same State responded to a question, we noted the tally in parentheses. For example, “IA(2)” indicates that two different Iowan agency personnel responded, and both indicated that they estimated 1 to 1,000 ferrets in their State. These duplicates were not counted twice in tallies.*



From this partial response to our survey, we have a lower bound of about 60,000 and an upper bound of about 600,000. Since no State agency personnel estimated a ferret population of greater than 100,000 in their State, we could extrapolate that the upper bound in all 50 States is 5 million (50 x 100,000) ferrets. However, since the majority of State agencies responded in the range of 1 to 10,000, the lower bound might be 500,000 (50 x 10,000). A more reasonable inference from the questionnaire data is a USA ferret population of about 1 million.

In his response to the CSUS questionnaire, Dr. Kent Fowler (California Department of Food and Agriculture) checked the answer: *“Can’t say precisely, but my professional estimate of the range of domesticated ferrets that exist in my State is: 10,000 to 100,000”*. Based upon the literature reviewed and the responses received from California agency personnel, we feel that a range of 50,000 to 100,000 ferrets within California is a fair estimate.

Three Canadian agencies responded: New Brunswick and Nova Scotia agency personnel both responded *“estimate 1 to 1,000”*; and British Columbia responded checked box = *“Domesticated ferrets are not known to exist in my State”*.

## 7.4. ESTIMATES FROM THE PET TRADE INDUSTRY

In their 2009-2010 survey, the American Pet Products Association, Inc. (2010) reported that in the USA, 5.3 million USA households owned small animal pets (this category included ferrets), translating into 5% of the USA population owning a small animal pet; this represents a decline from the last survey period in 2008. The total number of small animal pets owned in the USA in 2009-2010 was 15.9 million, with 42% being rabbits, 30% hamsters, 15% guinea pigs, and 8% ferrets. Thus, the American Pet Products Association, Inc. (2010) estimated, indirectly, the total number of pet ferrets in the USA at 1.3 million (= 8% of 15.9 million small animal pets). It was also reported that ferret owners have an average of 2 ferrets per owner, the average purchase cost of a ferret was \$123, and regardless of which species of the small animal owned, the average length of time as an owner was slightly less than 2 years (American Pet Products Association, Inc. 2010).

Census data was requested of Marshall Pet Products, Inc., the largest ferret breeder in North America. Their response was as follows:

“We estimate that ferret sales are in the range of 150,000 animals each year....the numbers for research would be about 10-15% of that” (Paul Juszczak, Director of Sales, Marshall Pet Products, pers. comm., 2010).

Some authors claim incorrectly that ferrets are the third most popular pet in the USA, after dogs and cats: provided are two excerpts of this claim:

“Ferrets are among the top-three popular pets in the United States....They must have human contact every day with anyone the age of 12 or older; children younger than 12 can harm ferrets. Yes, some ferrets do nip at you...ferrets stay like kittens all their life, right up to their death about ages 5 to 8 years old in the Florida environment.” Anonymous. 2008. Ferrets can learn not to nip. Orlando Sentinel. Orlando, Florida. November 25, 2008. Pg. A16.

“Considered the third most popular pet in the United States...” (p. 697, Boyce *et al.* 2003)

These authors give no evidence to support their claim, and this is not supported by annual reports provided by pet product manufacturing associations. In the 2009-2010 survey, the American Pet Products Association, Inc. reports that in the USA, 71.4 million households owned pets, split as follows: 39% owned a dog, 33% own a cat, 12% owned a fish/bird/equine; 4% owned a reptile; and 5% owned a small animal (with ferrets representing 8% of this small animal category, while 42% were rabbits). Thus, the third most popular pet is probably a fish, bird, or horse.

## 7.5. SUMMARY AND OPINION

The enumeration of ferret populations, both as pet and laboratory subject, in USA and California is important for many reasons. No scientific census of ferrets has ever been performed in the USA; all existing estimates are based upon opinion or extrapolation of pet owner surveys or ferret product sales. Published estimates for total numbers of pet ferrets in the USA for the last decades of the 20<sup>th</sup> century range from 275,000 to 10,000,000. Estimates for total numbers of pet ferrets

in California for the last decades of the 20<sup>th</sup> century range from 30,000 to 1,000,000. In 2010, the American Pet Products Association, Inc. estimated, indirectly, the total number of pet ferrets in the USA at 1.3 million (8% of 15.9 million small animal pets). Based upon crude extrapolations from our literature review and CSUS questionnaire, we estimate a USA pet ferret population of about 1 million, and a California pet ferret population between 50,000 to 100,000.

## 8. ANALYSIS OF POTENTIAL WILDLIFE ISSUES

### 8.1. REASONS FOR CONCERN

California, and specifically, the California Floristic Province, is considered by most conservation biologists to be among the World's megadiverse regions, as well as a global hotspot (defined as megadiversity under imminent threat)(Stein *et al.* 2000). Impacts from invasive species are second only to habit loss in worldwide biodiversity loss (Stein *et al.* 2000). Mooney *et al.* (1986) described California's situation:

"California is a land of unusual biotic diversity. It comprises a wide range of indigenous ecosystems including a diversity of forest, woodland, scrub, and grassland types as well as numerous kinds of aquatic ecosystems...The nature of these ecosystems is very different today than it was several hundred years ago. All have been impacted to varying degrees by anthropogenic influences...Here we focus on a particular class of ecosystem change that has been induced or greatly accelerated by the activities of humans, that of the introduction of exotic organisms. These introductions have, in certain cases, resulted in readily observable changes in ecosystem structure and hence function. In most cases, however, the ecological impact of these introductions is subtle and has not yet been determined." (p. 250, Mooney *et al.* 1986)

"In California there are 216 species of mammals, at least 11 of which are confirmed naturalized species with six additional questionable establishments (Williams 1979)(Table 15.1). The naturalized species include the Virginia opossum (*Didelphis virginiana*), Norway and black rat (*Rattus norvegicus* and *R. rattus*), house mouse (*Mus musculus*), gray squirrel (*Sciurus carolinensis*), fox squirrel (*S. niger*), wild burro (*Equus asinus*), wild horse (*E. caballus*), wild pig (*Sus scrofa*), Barbary sheep (*Ammotragus lervia*), and Himalayan tahr (*Hemitragus jemlahicus*)...The ecological impact of certain of the introduced mammals has been well documented as noted below. On the other hand there is very little information on the impact of pet mammals on the native fauna." (p. 254, Mooney *et al.* 1986).

Hawai'i and tropical Florida are also part of regions of megadiversity and global hotspots. South Florida has 44 mammal species, 10 of which are exotic species; the nine-banded armadillo (*Dasypus novemcinctus*) is given as a "notorious" example (Ewel 1986). Ewel (1986) explains further:

"South Florida contains more conspicuous introduced plants and animals than any other region in the continental United States. At the same time the region also encompasses one of the largest contiguous complexes of preserved ecosystems in the eastern U.S." (p. 213, Ewel 1986)

At least 4,552 exotic species have established free-living populations in USA, 142 of which were terrestrial vertebrates (Office of Technology Assessment 1993).

Islands are particularly sensitive to exotic species invasions for a variety of reasons: Moors (1983) summarizes this issue thoroughly using New Zealand as a case study. Courchamp *et al.* (2003) provides this summary of potential impacts:

"The invasion of ecosystems by exotic species is currently viewed as one of the most important sources of biodiversity loss. The largest part of this loss occurs on islands, where indigenous species have often evolved in the absence of strong competition, herbivory, parasitism or predation. As a result, introduced species thrive in those optimal insular ecosystems affecting their plant food, competitors or animal prey. As islands are characterised by a high rate of endemism, the impacted populations often correspond to local subspecies or even unique species. One of the most important taxa concerning biological invasions on islands is mammals. A small number of mammal species is responsible for most of the damage to invaded insular ecosystems: rats, cats, goats, rabbits, pigs and a few others. The effect of alien invasive species may be simple or very complex, especially since a large array of invasive species, mammals and others, can be present simultaneously and interact among themselves as well as with the indigenous species." (p. 347, Courchamp *et al.* 2003)

Atkinson (2001) discusses the concept of “mainland islands”, which are intensively managed areas such as nature preserves that are targeted for ecological restoration, and specifically, the removal of non-native mammals. Several authors, including Jurek (2001), suggest that California may function as an island. However, the comparison of California to islands lacking native predators is not fully valid; twenty native species of terrestrial carnivores in California (Jurek 2001), 11 of which are mustelids.

The following excerpts are provided to summarize some of the issues involved in the introduction of exotic predators:

“Pimm (1987) suggested that the impacts of exotic species on invaded systems should be most severe when (1) species are introduced into predator-free areas; (2) polyphagous species are introduced; and (3) species are introduced into relatively simple communities. Vitousek (1990) suggested that invaders can change ecosystems when they ‘(1) differ substantially from natives in resource acquisition or utilization; (2) alter the trophic structure of the invaded area; or (3) alter disturbance frequency and/or intensity’... It is difficult to predict which exotic species will become pests following invasion because resources exploited in the new environment may differ from those exploited in the native range (Bateman, 1977). Such changes in resource use may result from interspecific interactions in the invaded community (Bateman, 1977) or from genetic changes among the invaders (Howard, 1965; Ehrlich, 1986; Mooney et al., 1986).” (p. 150, Smallwood and Salmon)

“Most introductions of species into new habitats are failures (deVos & Petrides, 1967). For example, of the 150 or so species of birds introduced to Hawaii, and of the 145 introduced to New Zealand, ‘only’ 30 and 36 have become established, respectively (Roots, 1976; Veitch & Clout, 2001). This relates to what has been termed the ‘10’s rule’: approximately 10% of introductions succeed and approximately 10% of these will be significantly ecologically disruptive (Williamson, 1996)..... It is generally very difficult to assess the impact of an introduced species on the ecosystem it has invaded (Parker et al., 1999). In most cases, data are not available to compare communities before and after the invasion.” (p. 349, 350 Courchamp *et al.* 2003)

“The concept that mammalian predators are an effective and important agent for controlling undesirable animal populations is almost as old as agriculture. Some success has been achieved in temporarily lowering pest numbers, particularly in island situations. However, the destruction of non-target prey species by the introduced predators far outweighs any advantage gained by these attempts at biological control (Pimentel 1955; Howard 1967; Uchida 1968; Tomich 1969).” (p. 125, Sullivan and Sullivan 1980)

## **8.2. LIFE HISTORY TRAITS OF IDEAL INVADERS COMPARED TO FERRETS**

### **8.2.1. Life History Traits of Ideal Invaders**

The characters of a model invasive species include: commensal or mutualist relationship with humans; omnivory and ability to live in a wide range of physical environments; relatively long life span and short reproductive cycle; competitive superiority over genetic relatives; larger size than competitors, and successful in its native range; male not needed for colonization after fertilization of female; ‘predator release’ in new environment; and high genetic variability (Ehrlich 1986; Newsome and Noble 1986; Bomford and Hart 1998).

According to Forsyth *et al.* (2003), the process of biological invasion involves at least 4 stages:

“(1) transport, the movement of an exotic species from its source range to the new environment; (2) introduction, release or escape from captivity; (3) establishment, the transition from captive or escaped individuals to a self-sustaining wild population; and (4) spread, the expansion of geographical range beyond the point of release or escape.” (p. 558, Forsyth *et al.* 2003)

Three factors increase the probability of establishment of an exotic species: the number of individuals released and the number of release events; the degree to which the new habitat matches the climate of the introduced species’ native habitat; and life history traits that encourage colonization (Forsyth *et al.* 2003).

### 8.2.2. Life History Traits of Ferrets

King and Moors (1979) compared the life histories of 6 mustelids, and concluded that polecats (*M. putorius*) were in the middle of the continuum of *r*-selected strategists such as weasel and stoat *k*-selected strategists such as otters (*Lutra lutra*) and badgers (*Meles meles*); the excerpt is provided:

“The European polecat has some of the characters of both groups: it is larger than the *r*-strategists but matures earlier and has larger litters than the *K*-strategists. Very little is known about the population dynamics of the wild polecats, but the available information indicated that it occupies a center position in the *r*-*K* series.” (p. 620, King and Moors 1979).

See MacArthur and Wilson (1967) for a definition and discussion of *r*- and *K*-selection life history theory.

Some of the life history traits of ferrets are known, and discussed by authors such as King and Moors (1979) and Clapperton (2001). New Zealand biologists have performed the most extensive studies on population dynamics of ferrets (e.g. Lavers 1973). Byrom (2002) studied the dispersal and survival of juvenile feral ferrets in New Zealand. Clapperton (2001) summarized the population dynamics of feral ferrets, including estimates of mortality, recruitment, and age-specific survivorship.

The following authors suggest the ideal conditions for establishment of a feral ferret population:

“Perfect conditions for establishment of a feral ferret population would accommodate their biological limitations. The ideal region for introduction would have moderate climate, a superabundance of preferred prey (rabbits or possibly rats, *Rattus norvegicus*) and be devoid of competitors and possible predators. The ferret population introduced would be large and the introductions repeated frequently.” (p. 4, Fitzgerald, unpub. report).

“However, wild polecats are surprisingly tolerant of human activity, and often inhabit the vicinity of settlements or rabbit burrows where they may meet domestic ferrets (JDSB unpub. data; Blandford, 1987; Weber, 1989). Since domestic ferrets have been selectively bred in captivity for hundreds of years (MacKay, 1995), the resulting qualities of docility and tameness may limit the capacity of ferrets to survive and breed in the feral state (Poole, 1972). These circumstances will favour strong selection for a polecat ‘phenotype’, and may explain why the enduring feral ferret colonies are found on offshore islands where native predators are scarce or absent (Blandford and Walton, 1991).” (p. 159, Davison *et al.* 1999).

*Ferrets for Dummies* provided the typical argument made by pro-ferret groups against the possibility of ferrets establishing feral breeding populations in the wild:

“Feral ferrets in my neighborhood? Perhaps the most outrageous misconception about owning ferrets—or unfounded paranoia, actually—is the fear that pet ferrets will escape, unite in the wild, form large feral (wild) colonies, and develop their own organized crime rings. Okay, maybe I’m exaggerating a bit. But some governmental suits actually believe the part about the development of feral colonies. These politicians preach the idea that these colonies of roving feral ferrets will destroy native wildlife and livestock. Here are some reasons why the feral-ferret scenario is very unlikely:

- Ferrets are domestic animals (see the previous section), and they rely on humans for survival.
- The majority of ferrets entering the pet trade are spayed or neutered.
- Ferrets are indoor pets and escape is unlikely.

Many species of domestic animals are capable of going feral, but for a colony to form, their environment has to be just perfect for them, and they have to have the necessary skills. In particular,

- There must be several feral breeders around to make more animals.
- There must be an open niche. North America has few open niches left for small predatory mammals such as the ferret. The niches are already filled with more competitive mustelids (a ferret’s cousins), such as the American mink and the long-tailed weasel.
- The animal must know how to escape from predators and find food.

These are just a few of the many reasons why the likelihood of ferrets taking over your environment is very small.” (pp. 42-43, Schilling 2007)



Herman (2000) represented the pro-ferret argument well, and the excerpt is provided here:

“One of the main considerations regarding the legalization of ferrets (and their classification as domestic and not wild animals) is the likelihood that these animals may escape and form feral colonies, thus ravaging the local wildlife and especially harming endangered animals. Several studies have addressed feral ferrets, and an application of their findings indicates that the menace to California's wildlife by feral ferrets has been exaggerated.

The key studies of feral ferrets center on New Zealand; thousands of ferrets were introduced there in the late nineteenth century to control the rampant increase in feral rabbits (themselves descendants of rabbits brought with the English settlers less than a half-century earlier). By 1900, ferrets had become established in the wild, and eventually the New Zealand government considered them pests. The California Department of Fish and Game has cited the New Zealand feral ferret experience as a justification for banning ferrets. Similar studies on feral ferret populations on San Juan Island (Puget Sound, Washington) have also been cited by the CDFG. Reports of feral ferrets have also been generated in the Australian state of Queensland, where ownership of ferrets is illegal. Feral ferrets were also reported from New Mexico in the mid-1980s. As in New Zealand, the New Mexico ferrets were the offspring of animals that had been purposefully introduced in large numbers to control ‘pests’ (in this case, prairie dogs).

Yet the concerns raised by these studies and reports are largely inapplicable to California. In fact, the studies actually alleviate fears of the potential of ferrets for destroying wildlife in general and birds in particular.

First, New Zealand is a self-contained island ecosystem, about 1000 miles from the nearest continent, without any large native predators that could control the ferret population (i.e., domestic dogs and domestic cats, as well as birds of prey and other forms of wildlife). The same is true to a lesser extent in Australia, where the only predatory carnivore that predates the European settlement is the dingo (the feral descendant of dogs brought to Australia by the aborigines). In the absence of such apex predators, ferrets are more likely to thrive in the wild. Second, the European settlers and their dogs, cats, and other imported animals had become the primary destroyers of wildlife before the introduction of ferrets. As one researcher has noted, ‘The mustelids [i.e., ferrets and weasels] cannot be proved to be directly responsible for any of the long list of island populations of birds that we know to have gone extinct since the human colonization of New Zealand.’ Third, at least one study has indicated that ferrets would not be a menace to birds, since examinations of wild ferrets show that birds comprise only a small percentage of the ferret diet, with the bulk being made up of rabbits and hares.

In addition, the appearances of feral ferrets in New Zealand and New Mexico are the result of an introduction of ferrets for a purpose other than pet ownership—namely, as a form of alternative pest control. As large numbers of these animals were systematically turned loose to kill populations of animals considered to be pests, their odds of establishing feral colonies would presumably be much higher than for ferrets that are kept as housebound pets. However, the CDFG has not specifically addressed the differences in potential havoc between the occasional escape of pet ferrets, as opposed to systematic releases.

By contrast, the domestic cat (*Felis domesticus*), whether living as a pet or running loose in feral form, exceeds the ferret in its danger to wildlife, primarily birds. Each year in the United States, cats kill hundreds of millions of migratory songbirds; a report by ornithologist Stanley Temple of the University of Wisconsin estimated that at least 20 million—and perhaps as many as 150 million—songbirds are killed by cats every year in rural Wisconsin alone. Another estimate placed the daily kill of songbirds by cats in the United States at 4.4 million.

The domestic cat, like the ferret, is a non-native predator in California; the U.S. Fish and Wildlife Service reports that ‘feline predation is not “natural” . . . The “tabby” that sits curled up on your couch is not a natural predator and has never been in the natural food chain in the Western Hemisphere.’ Indeed, cats—like ferrets—were originally imported into America as ‘working’ animals (to control rats and other pest animals), prior to breeding and ownership as household pets.

A report by University of Wisconsin researchers states that ‘worldwide, cats may have been involved in the extinction of more bird species than any other cause, except habitat destruction’ and lists several bird species whose existence is currently threatened by cats, including least terns and loggerhead shrikes. The Wisconsin report also noted that cats introduced to Florida's barrier islands have nearly destroyed several unique rodent species. By contrast, CDFG's concern over escaped ferrets wreaking havoc on least terns is countered by correspondence from the Massachusetts Department of Fisheries & Wildlife that states that ‘there has never been a recorded case of tern predation by a ferret in Massachusetts . . . in fact, I have never heard of such a case anywhere in North America.’

Furthermore, the hunting effectiveness of domestic cats, which rivals the efficiency of wild predators, is enhanced by the inability to suppress the desire to hunt with adequate supplemental food; "even when fed regularly by people, a cat's motivation to hunt remains strong, so it continues hunting." Indeed, well-fed domestic cats, not needing to hunt for survival, can wait patiently for birds and other hard-to-catch prey to wander into range. The steady food supply from people, whether owners or other well-intentioned cat lovers, helps keep cat populations high at times when populations of regular prey animals are low (thus triggering declines in natural predator populations), and allows cats to continue to hunt common and rare species alike.

Cats can compete with native predators, and eat many of the same prey species. Also, cat densities are greater and are often not limited by territory. Some parts of rural Wisconsin have as many as 114 cats per square mile—a density several times greater than all midsized native predators combined.

In the context of this statistical evidence on cats, CDFG's fears of escaped and hungry ferrets multiplying quickly and destroying rare birds and other endangered species seem exaggerated. The ferret diet, when compared to that of cats, is skewed heavily toward rabbits and hares, and small rodents, the sort of prey species that cats would also pursue, in addition to the bird species that cats catch more successfully than ferrets. Cats make the transition to feral life more easily than ferrets, as evidenced by the difficulty in finding feral ferret populations in areas that were neither (a) islands without competing natural predators nor (b) heavily ‘seeded’ with ferrets in order to control various animals considered pests. Therefore, a ban on ferrets based on their potential threat to endangered and other native species would be ineffective without a concurrent prohibition of cat ownership because of their well-documented destruction of bird populations.” (p. 44-48, Herman 2000).

Pro-ferret organizations also make the argument that thousands of ferrets already exist in California, but have done no documented harm to wildlife and have not established any feral breeding populations. Some excerpts from the literature are presented here:

“Wright says despite the domestic ferret's illegal status, thousands of people keep ferrets as pets in California, and have done so for many years with no discernible ill effects on agriculture or the environment.” (Tone 2007)

“Another misconception is that ferrets will establish in the wild. Ferrets have been in the United States in large numbers for over 300 years and have never been able to do this. There are no wild ferret colonies anywhere in the world. Errors probably stem from confusing the domestic ferret (*Mustela furo*) with the American black-footed ferret (*Mustela nigripes*).” (Morton and Morton 1995)

Marshall Farms Group, Ltd., has been breeding ferrets for over 70 years for the pet and research industries, apparently without any accidental release of ferrets into the environment (Marshall Farms Group, Ltd., pers. comm., 2009). Marshall Pet Products’ argument is similarly stated:

“The Montezuma Wildlife refuge is only about 30 miles from our breeding facility and we are located right on Lake Ontario. Both areas have some of the largest concentrations of breeding water fowl in the country. We know of zero problems with ferret’s destroying nests or preying on nesting fowl. The populations of most or all of these birds is exploding.” (Paul Juszczak, Director of Sales, Marshall Pet Products, pers. comm., 2010).



Other authors suggest that ferrets are unfairly regulated as wildlife, and that many dangerous wildlife species are not regulated at all. Provided here is an example:

“...many dangerous animals can be imported or possessed in California without a permit, even though they are neither domesticated nor ever could be. For instance, there is no provision in Fish and Game Code section 2118, or in title 14, section 671 of the California Code of Regulations, prohibiting possession of a pet rattlesnake in California, even though rattlesnakes are wild animals posing a menace to public safety. In fact, six different rattlesnake species may be legally possessed in California, because they are ‘natives,’ even though they are some of the most aggressive and dangerous animals in the Western Hemisphere. Thus, one can own a rattlesnake in California without any interference from the state, unless the snake bites someone.” (p. 50, Herman 2000)

Umbach (1997) provides the following argument:

“3. Hazard to wildlife

DFG Views

The Department of Fish and Game has asserted that domestic ferrets may escape their homes, form feral colonies, and prey on native wildlife. The Department also asserts that ferrets may carry diseases that could threaten native wildlife.

Ferret Proponents’ Response

Proponents respond that ferrets do not ordinarily survive more than about 3 days outside the home and are not known to have established feral colonies anywhere without substantial, concerted efforts to create such colonies.

Evidence and Discussion

Robert S. Ellarson, of the University of Wisconsin, asserts in the article ‘Ferrets’ in Encyclopedia Americana that ferrets do not survive more than about 3 days in the wild. Some experts believe on the basis of observation and experience that ferrets could survive longer than 3 days, but that survival would be in weeks, not months. One wildlife biologist, however, did assert that he has seen the killing ability and instinct in ferrets personally, and offered the opinion that individual ferrets could survive and predate. Dean Biggins, a leading expert on the black-footed ferret and project leader for the blackfooted ferret project, U.S.G.S. Biological Resources Division, did explain how difficult it has been to reestablish those animals in the wild, even though they are much closer to their wild progenitors (in terms of generations in captivity) than are domestic ferrets. He noted that ferrets keep their ability to hunt and kill better than the ability to elude predators. He asserted that escaped domestic ferrets (like the black-footed ferrets) are more likely to become prey than to survive long as predators in any area with predators (including cats and dogs). The latter point bears on the feral colonies of ferrets in New Zealand. Ferrets (and other predators) were introduced there to combat unwanted rabbit populations. The feral colonies could be established and maintained there because of a lack of predators that in other places would kill the ferrets. New Zealand, therefore, differs from the United States. In the United States, ferrets would likely fall prey to cats, dogs, various wildlife, and even some raptors (birds of prey, such as hawks). Discussions (by telephone) with personnel in Arizona, Colorado, Florida, Massachusetts, Michigan, South Carolina, and Wyoming elicited no evidence of feral colonies of ferrets or of any significant survival of the animals in the wild, nor of reported impact on native wildlife caused by escaped domestic ferrets. This is consistent with the reports from various state wildlife agencies included in the California Domestic Ferret Association compilation.

Conclusion

It appears improbable that domestic ferrets could establish feral colonies in California, given the risks of ferrets themselves being prey. While individual ferrets might survive up to a few weeks in the wild, they are very unlikely to survive longer than that. Despite the lack of documented examples, the possibility cannot be excluded that escaped ferrets might do significant damage to wildlife, such as ground-nesting birds, and possibly including endangered species, during a period up to a few weeks of survival, even without establishing continuing colonies. Ongoing releases or escapes of domestic ferrets might replenish the population in the wild, even if the animals were not reproducing, and this could contribute to a continuing hazard to wildlife. Ferrets would be less likely to pose a hazard of ‘going feral’ if (1) sales of ferrets within California were limited to licensed breeders and suppliers; (2) ferrets were required to be spayed or neutered (possibly with a registration requirement to encourage

compliance); (3) any pet ferret brought into the state (not purchased from a recognized, in-state breeder or supplier) were required to be spayed or neutered (and registered, if appropriate); and (4) a public education campaign were conducted within the State to inform Californians of proper care for ferrets, including the importance of keeping them indoors or under proper supervision when outdoors, and the requirement that they be spayed or neutered. No one can predict with certainty whether ferrets would damage native wildlife in California. California Department of Fish and Game wildlife biologist Ronald Jurek noted that even 20 years ago, the red fox, which was introduced into the state (though not as a domestic animal) a century ago, was not viewed as a threat, although it has clearly become one since.” (pages 4-5, Umbach 1997)

Obviously, sterilized ferrets cannot establish breeding populations. But not all ferrets currently within California are sterilized. It is not true that only sterilized ferrets are available on the pet market. Fertile ferrets are advertised for sale on various Internet websites. An entire chapter of *Ferrets for Dummies* explores the question “*Should you breed your ferret?*” (Schilling 2007). The State of California has not been able to stop the importation of ferrets with the current restrictions in place and with its current policing forces; how will the State ensure that no fertile ferrets are imported into California in the future with legalization? Thus, some risk of ferrets establishing feral breeding populations still remains; no author or scientist has been able to convincingly enumerate that risk.

And while it may be true that ferrets made available through the pet trade do not possess the necessary traits to become an invasive species, polecat-ferret hybrids and polecats may have these necessary traits. The State of California has not been able to stop the importation of ferrets with the current restrictions in place and with the current policing forces; how will the State ensure that no polecat-ferret hybrids or polecats are imported into California in the future with legalization? Like wolf-dog hybrids, some ferret owners may wish to have a more unique animal than the common pet ferret stock produced by companies such as Marshall Farms. Polecat-ferret hybrids are advertised for sale on various Internet websites.

*Ferrets for Dummies* discusses the hybrid topic, as follows:

“The subject of ferret hybrids is a hotly debated topic in many ferret circles. Very simply put, a hybrid is a cross between a domestic animal and its wild counterpart—in this case, a ferret and a polecat...You must examine what it is that makes people attracted to the ferret hybrid in the first place....Some argue that if done responsibly and correctly, hybrid breeding can enhance existing ferret bloodlines and make ferrets healthier, hardier, and sounder by introducing polecat blood into the mix.” (p. 27, Schilling 2007)

“A hybrid ferret certainly has some benefits:

- A hybrid is a beautiful animal. They often bear beautiful, dark markings and have stocky, muscular bodies.
- Hybrids have much better eyesight than non-hybrids, and they rely more on eyesight than domesticated ferrets do.
- They have extraordinary physical capabilities.
- They are very dominant and independent in most situations....

The cons of hybridization. Most ferret-polecat offspring—especially those with a high percentage of polecat blood—display the characteristics of the wild polecat, which certainly isn’t favorable in a captive environment. Hybrids, in general, display the following characteristics:

- They’re shy and fearful of humans.
- They’re less social and less willing to live in groups...
- They don’t tolerate new people or being held, and they’re quick to bite if they feel uncomfortable.
- They don’t tolerate being caged very well; they need a lot of room to roam and explore on a daily basis. Ferret-proofing can be quite challenging, and the result is that hybrids are very accident-prone in a household...”

(pp. 27-28, Schilling 2007)

Thus, any ferret legalization actions may need to assure CDFG that there is no possibility that hybrids or polecats are imported into California, or demonstrate that hybrids and polecats do not pose a threat to the environment if they are released into the wild.

### 8.2.3. Ferret Life Expectancy and Reproductive Potential

Life expectancy is 5 to 8 years, with some ferrets living up to 10 years (Applegate 1998; Boyce *et al.* 2001; Ball 2002); Bowen (1997) claims pet ferrets may live up to 14 years. Some authors report that captivity may increase the lifespan, such as the following excerpts:

“...good nutrition probably can lengthen a ferret’s lifespan from the eight years common today to 10 or 12 years.” (p. 60, Williams 1984).

“Ferrets in captivity can live for 8-14 years, but probably no more than 4-5 years in the wild.” (p. 328, King 1999)

“Two major concerns are that animals produced in captivity will not be able to adapt to natural conditions and that reintroductions will be disruptive to remaining wild populations. The first concern is especially significant for a predatory species like the black-footed ferret whose survival skills may be culturally transmitted....The second problem of disruption to remnant wild populations does not currently apply to the black-footed ferret...” (p. 212, Foose 1989).

“Domestic ferrets will not survive long in the wild. As pets, they can live from 6-10 years. There are a few diseases and disorders that can shorten the life of domestic ferrets if not treated. Some of these diseases and disorders include: canine distemper, feline distemper, rabies, parasites, bone marrow suppression, insulinoma, adrenal gland disease, diarrhea, colds, flus, ringworm, heat stroke, urinary stones, and cardiomyopathy. (Kaytee 2001, MNAALAS date unknown, Schilling 2001).” (p. 2, Duda 2003)

Ferrets are susceptible to many diseases and infections (see reviews by Ryland and Gorham 1978, Fox 1988, and Schilling 2007), and this susceptibility makes this pet expensive to own and it shortens its average lifespan (Schilling 2007).

The ferret is considered polyestrous, and can produce 2 litters per year (Seal 1989); some literature suggests that ferrets may produce more than 2 litters per year. *M. putorius* are capable of breeding at 10 to 11 months of age for males, 7 to 12 months for females (Mead 1989). Litter size is 2 to 12 (Mead 1989; Murphy 1989). Some authors suggest that domesticated / captive populations may have greater reproductive success, such as the following:

“The wild European ferret however, usually produces only one litter, while the domesticated ferret produces two or more litters yearly.” (p. 6, Fox 1988).

“It is possible to produce two litters per jill per season under natural lighting...With manipulation of artificial light, a jill may produce 3 or 4 litters.” (p. 1158, Besch-Williford 1987)

“The breeding season is relatively short in most females that produce a single litter each year, lasting only 1 to 2 months, but is prolonged in species such as *Mustela putorius* and *M. nivalis* that can produce 2 or more litters yearly.” (p. 124, Mead 1989).

Female ferrets, known as jills, have certain physiological challenges relating to their reproductive system:

“Jills are induced ovulators, meaning that they remain in heat indefinitely if they are not bred or otherwise stimulated to ovulate. Ferrets are unique in that many of these in persistent estrus would die within 2-3 months if left unbred, because the chronically high estrogen levels can cause bone marrow depression. Jills in prolonged estrus may die of hemorrhage due to thrombocytopenia, severe aplastic anemia, or infections induced by leukopenia...The most effective means of avoiding this problem in a nonbreeding female is to spay the jill before puberty” (p. 39, Ball 2002)

“The DHS report [referring to Constantine and Kizer 1988] noted that unless they are bred or neutered, half the females will die from hypoplastic anemia, a fate associated with their reproductive process. Unless bred or spayed, female ferrets continue to ovulate. Ovulation induces high levels of estrogen in their blood streams, which depresses their bone marrow and leads to anemia. ‘It’s a constant problem,’ says DFG veterinarian Dave Jessup. When combined with the relatively short life span of ferrets (about half that of cats and dogs), this mortality risk may render ferrets less desirable as pets than other common pet species, the report said.” (p. 8, Weissner 1991).

Sterilized ferrets are commonly offered in pet stores. *Ferrets for Dummies* suggests the following statistic:

“About 85 to 90 percent of the ferrets sold into the pet trade in the United States are altered and descented at weaning and are therefore unbreedable.” (p. 332, Schilling 2007)

However, there are many private breeders that offer non-sterilized ferrets. *Ferrets for Dummies* provides advice on finding and using private breeders, but offers this advice:

“If you love ferrets (and presumably you do if you want to breed them), you don’t want to bolster the need for shelters...As ferrets gain popularity as companion pets in households, the number of furballs that wind up in shelters also increases, as does the number of deaths of these homeless fuzzies. Careless breeding by humans is the cause for overpopulation. The population of fuzzbutts at ferret shelters such as the Greater Chicago Ferret Association can fluctuate between 60 and 100 ferrets at a time. That’s a lot of displaced furkids. Many are geriatric fuzzies that no longer fit into the perfect pet mold their humans have illogically created. These unfortunate souls get dumped for younger or different pets...Some people even dump fuzzies into the wild to futilely fend for themselves.” (pp. 335-336, Schilling 2007)

Pro-ferret authors make the argument that since black-footed ferrets raised in captivity had difficulty establishing breeding populations in the wild, so would escaped domestic ferrets. Russell *et al.* (1994) report limited reproductive success in black-footed ferrets raised in captivity and then released into their native range:

“Because the reintroduction was experimental and because high mortality rates of black-footed ferrets born in the wild Meeteetse population indicated that survival rates of reintroduced black-footed ferrets would be low, it was important that animals chosen for reintroduction would not jeopardize the genetic goals of the captive program.” (p. 264, Russell *et al.* 1994)

“Survival for 30 days by at least 25% of the reintroduced animals is very encouraging. Natural mortality during the first year in the wild is high.” (p. 265, Russell *et al.* 1994)

Other excerpts pertaining to the difficulty of re-introducing the black-footed ferret are provided here:

“Only 8 of the 18 original animals [black-footed ferrets] captured at Meeteetse for the captive breeding program were believed unrelated enough to be considered genetic founders. Abnormal physical features (including webbed feet, kinked tails, short tails, oddly formed teeth, and internal hemorrhaging in kits) have been seen in some captive-born animals. Characteristics that favor survival and reproduction in captive animals may be different from those contributing to fitness of free-ranging ferrets. Captivity can affect animals in other ways, too. The unnatural cage environment may not help develop critical behavioral skills, a problem currently receiving research attention. Behavior is determined by environmental and genetic influences, but behaviors can be altered if a critical influence is absent or distorted.” (p. 13, Godbey and Biggins 1994).

“There is another potential time bomb ticking away, and that is the effects of being reared in artificial surroundings. Even with the careful hands-off policy practiced at Sybille, life in small cages of wire and wood painted government green is a far cry from life in a prairie dog community. The longer the black-footed ferrets remain thus confined, the more they risk becoming like the Siberian surrogates whose original traits already have begun to fade during their long sojourn in tame environments. Each new generation is a step farther along the road toward domestication, a process generally marked by a decrease in brain size as well as by the disappearance of key survival instincts...Yet the challenge of escaping predators is serious. Of the dozens of radio-collared Siberians released into the wild, a third sooner or later ended up in the jaws of badgers...Night-hunting raptors such as great horned owls snatched a couple as well. Obviously, any dulling of the black-footed ferrets’ natural instincts will undercut their chances of success during reintroduction. Put another way, continuing to hold them in a safe place creates a growing danger of its own.” (p. 16, Chadwick 1991).

It is not clear from the literature whether the comparison of the pet ferret to black-footed ferret survivability in the wild is completely valid.



### 8.2.4. Diet and Hunting Ability

The diet of *Mustela putorius sensu lato* described in the published literature varies from strictly carnivorous to omnivorous. Several authors state that the diet is strictly, or obligatorily, carnivorous (“hypercarnivore”), such as the following excerpts:

“Completely carnivorous, taking a wide variety of prey as available. In Britain this includes the brown hare, rabbit, voles, mice and hedgehog; birds; common frog and lizard; and a variety of invertebrates including insect larvae and earthworms. The most frequently found were mammals and frogs. Presence of blowfly eggs and larvae suggest that some food is taken as carrion. Mammal prey is often in the form of several young animals, presumably from a nest.” (p. 349-350, Corbet and Southern 1977).

“They [Mustelinae] are more strictly carnivorous than the other groups and are efficient predators on small animals.” (p. 12) (Anderson 1989).

“Ferrets are known as ‘obligate carnivores,’ attesting to their dietary requirements for protein of high quality and quantity.” (p. 38, Ball 2002)

“It is not generally known that the ferret’s choice of food is horse flesh. That must be an acquired taste, for, of course, the ferret could never secure such food.” (p. 32, Harding 1915)

Cannibalism of their own young is noted in the some literature on polecats and ferrets; some excerpts are provided here:

“When in young the jills require blood, and unless this is given to them, they will most probably eat their offspring. To illustrate the ferocity of these little animals and their thirst for blood when in this state, an instance may be quoted in which it is on record that they were known to have attacked a baby that by some means or other had been carelessly left unattended in a place to which they had access.” (p. 53, Everitt 1897)

“Before you decided to breed, ask yourself how you would feel about the following, because breeders face these situations at one time or another...Moms [i.e. jills] cannibalizing or killing the kits.” (p. 333, Schilling 2007).

Some sources describe the diet as mostly carnivorous, such as the following excerpt:

“Polecats are almost completely carnivorous, taking a wide variety of prey as available (Matthews, 1982). In Britain, this catholic diet includes shrews, voles, mice, rats, rabbit, hare, hedgehog (Lawrence & Brown, 1973); small birds, poultry, young game birds, eggs (Gouldsbury, 1977); frog, toad, lizards, snakes (Burton, 1976); and a variety of invertebrates, including beetles, bees, moth and fly larvae, spiders, slugs, snails and earthworms (Walton, 1970).” (p. 171, Blandford 1987).

Alterio and Moller (1997) described a varied diet of feral ferrets in New Zealand by examining gut contents; Roser and Lavers (1976) also discuss the ferret’s diet. Most published sources report that the primary prey items are rodents and rabbits (e.g., Anderson 1989; Alterio and Moller 1997; Clapperton 2001); the ferret’s predilection for rabbits is one of the primary reasons for its introduction into novel habitats where rabbit population control was desired. For example:

“Diet studies have shown that young lagomorphs (rabbits and hares; *Lepus europaeus*) are the most important prey species for ferrets in many New Zealand habitats.” (p. 363, Smith *et al.* 1995).

However, there are several published sources that describe the ferret and/or polecat to also have a predilection for milk (e.g. Everitt 1897). Fennell (1843) and Harding (1915) describe the ideal diet of ferrets kept in captivity as consisting of bread and milk. Likewise, Mannix (1967) describes a ferret breeding operation that used a similar diet:

“The ferrets got very little meat. ‘It seems strange that such a little killer as a ferret can be raised on wheat mash and milk, but apparently the milk takes the place of blood for them,’ Dick explained. ‘We tried giving them skimmed milk, but they have to have lots of cream. Ratcatchers who have only a few ferrets raise them on wholewheat bread with milk and a little raw hamburger.’” (p. 93, Mannix 1967)

Carnegie (1988) explained that this popular 19<sup>th</sup> century diet of milk and bread was misguided and detrimental to ferrets. This presumed predilection for milk has been used to explain accounts of ferrets attacking nursing human infants (see

review by Constantine and Kizer 1988). Both ferrets and polecats have been described as “bloodthirsty” (e.g. Bell 1837; Bachrach 1930), and the older literature describes many accounts of ferrets or polecats drinking the blood of their prey preferentially over eating other tissues (e.g. Fennell 1843, Everitt 1897). However, other authors, such as Branford (1987), state that *M. putorius* does not drink blood.

Both ferrets and polecats are sometimes described as indiscriminate killers and able to attack prey larger than themselves: “The cream-coloured ferret is a domesticated descendant of either the Asiatic or European polecat, but can soon revert to its wild form...Like the others of their clan, they are expert killers and overcome prey animals far larger than themselves.” (p. 110, Roots 1976)

“...a highly specialized and ferocious family—the Mustelidae. They are formidable killers, known for their voracious appetites and vicious dispositions. Secretive and sly, relatively little known, they are the most widely distributed mammalian predators on the continent.” (Haley 1975, p. 11.)

Besides discussing traditional commercial pet diets, *Ferrets for Dummies* suggests the “Evolutionary Diet”:

“The evolutionary diet is simple. Essentially, you feed your ferret what she evolved eating. The polecat’s diet is varied and includes, among other things, small mammals (rabbits, mature mice, weanling and older rats, and chicks), insects, amphibians, eggs, carrion invertebrates, and fish, with perhaps a tiny amount of fresh fruit to ‘season’ the diet...Because the ferret can consume an evolutionary diet, grow, survive, and successfully reproduce, the diet actually meets AAFCO (Association of American Feed Control Officials) requirements, the same as commercial kibble.” (p. 130, Schilling 2007)

“Converting your ferret to the natural world. Ferrets, like their polecat cousins, are olfactory hunters, meaning that they follow their noses to the dinner table. Whatever a ferret has consistently eaten during the first six months of her life, she’ll see as the preferred food in the future—called olfactory imprinting. Getting a ferret to betray her nose after chowing on kibble for so long can be challenging. However, it’s well worth the effort if you’re a true believer in the natural diet and want to broaden your ferret’s culinary horizons. Of course, the conversion should occur when your fuzzy is as young as possible, but you can teach old ferrets new tricks.” (p. 136, Schilling 2007)

“When your ferret finally switches to a raw food or evolutionary diet, she’ll be likely to try just about anything, which is important because you don’t want to stick just one food item in this diet.” (p. 137, Schilling 2007)

The popular literature is full of statements that ferrets have lost their instincts to hunt, and would not be able to survive long without human support. Encyclopedia Britannica (1995)’s entry on *Ferret* states, “Domesticated ferrets have become so dependent upon humans that they cannot survive without care and if lost often die within a few days.” (vol. 4, p. 747). Other examples include the following:

“Ferrets are among the top-three popular pets in the United States. They have been around for more than 3,000 years as a domestic pet and cannot live more than three days on their own because they cannot hunt and would starve. They must have human contact every day ....” Anonymous. 2008. Ferrets can learn not to nip. Orlando Sentinel. Orlando, Florida. November 25, 2008. Pg. A16.

“Wildlife and agricultural officials counter that wild ferret populations would pose a potentially serious impact on native species and small livestock animals, such as chickens and rabbits. Not true, says Fara M. Shimbo of Boulder, Colorado, author of two books on ferrets and director of the Office of Information for the Ferret Unity and Registration Organization (FURO). Pet ferrets are totally dependent upon their owners and their kibble bowls, contends Shimbo. Lost ferrets will usually starve in a few days, she says, and will not adapt to the wild if they stray from their homes.” (p. 6, Weisser 1991)

“Ferrets used to be much better predatory animals than they are today. Because they are kept primarily as pets, responsible breeders have bred only very docile adults. Many ferrets have become so gentle that we hear more and more stories of ferrets being very casual about rodents. The owners of a pet store once told me that they had a mouse escape and hide out in the ferret cage. The pet male ferret yawned and finished his nap. The unfortunate



mouse then ventured into the next cave of ferrets and found a female who still had some hunting instincts left. We know of another family who has one of the male ferrets we bred. This ferret has been completely adopted by their parakeet. The parakeet regurgitates food for him and regularly enters the ferret's cage. The parakeet pecks the ferret and initiates chase games. This ferret clearly has little hunting instinct left." (Morton and Morton 1995)

These authors give no empirical evidence to support their opinions. However, there are some scientific studies that suggest that hunting and courting behavior must be learned. Some examples are presented here:

"The animals eaten by the Polecat reflect its method of hunting, which depends largely on its sense of smell (Walton, 1970; see also Apfelbach & Ebel, 1975; Apfelbach & Wester, 1977). According to Apfelbach (1973a,b, 1978), smell serves as a sign stimulus for prey selection but the prey smell has to be learned. A sensitive period is supposedly established for this learning at 2-3 months of age and this then fixes the Polecat's food preferences for life. This did not hold true for captive Polecats studied by the present author (Blandford, 1986). The composition of the diet evidently changes with habitat type (Baliarin et al. 1980) and the dynamics of small mammal populations (Novikov, 1962), although a lack of consistency between authors in methods of presenting data makes detailed comparisons difficult." (p. 171, Blandford 1987).

"Living mammalian prey is killed by a neck bite, which is instinctive but only partly developed in young animals and must be perfected by practice (Eibl-Eibesfeldt, 1955, 1956b, 1963; Leyhausen, 1965)." (p. 172, Blandford 1987).

"Inexperienced male Polecats are immediately interested in females on heat. They seize them and attempt to copulate, but generally fail, as they do not grasp the female in the nape as do the experienced ones. The orientation of the bite in the nape must be learned, usually in sibling play (Eibl Eibesfeldt, 1963)." (p. 173, Blandford 1987).

"In ferrets acoustical, optical and olfactory cues are important for hunting. In spite the fact that in this carnivore searching for prey can be elicited by odors alone, innate olfactory recognition of prey does not exist. The results suggest rather, that ferrets have to learn how their prey smells." (p. 294, Apfelbach 1978b)

### 8.2.5. Other Relevant Traits

Habitat requirements or preferences of feral ferrets are discussed in Clapperton (2001). Other traits relevant to this study are surmised in the following excerpts:

"As compared with the European polecat or F<sub>1</sub> hybrids, the ferret is less alert, unafraid of man, tolerant of drastic changes in environment and shows less neophobia." (p. 35, Poole 1972).

"At least 3 species, the European ferret (*Mustela putorius*), the mink (*Mustela vison*), and the sable (*Martes zibellina*), have been raised extensively in captivity. The ferret alone is gentle enough to qualify as a domestic animal and has been the subject of domestication in Europe for at least 2,000 years (Hammond and Chesterman 1972). The first ferrets were imported to the United States in 1875 (Ryland and Gorham 1978)." (Murphy 1989, p. 107).

"A screeching sound means fear and warning, and ferrets startled enough to screech may also express their anal glands, producing a very foul-smelling secretion. Removal of the scent glands prevents this, but will not eliminate the typical ferret odor, which is more distinct in sexually intact males and females. Neutering will reduce, but not totally eliminate, this species-typical musky odor." (p. 38, Ball 2002).

Gewalt (1959) claimed that polecats and ferrets had differing color vision abilities, and attributed those differences to the eyes—his subject ferrets, all albinos, had red eyes.

Ferrets are often described as being intolerant of cold, and some authors go so far as to suggest that their distribution is distinct from polecats, which can tolerate cold and hunt in the snow and are distributed closer to the North Pole (Bell

1837; Harding 1915). Various authors suggest that ferrets are intolerant of hot temperatures (e.g. Schilling 2007). Another excerpt is provided here:

“Poor sweat gland development. Ferrets are prone to heat stroke above 35 C.” (Lewington 1988, p.2)

Most of these accounts of ferret thermal requirements lack empirical evidence. The physiological requirements of ferrets may limit their ability to survive or establish breeding populations in those areas of California that experience prolonged freezing conditions or prolonged hot temperatures.

Ferrets are highly susceptible to canine distemper; the case fatality rate approaches 100%, according to Ryland and Bernard (1983). Another source states a similar statistic:

“Canine distemper is the most serious disease in ferrets. Essentially 100% fatal, the morbillivirus that causes canine distemper results in an accelerated syndrome that closely mimics signs seen in canids and other susceptible species.” (Williams 2010)

Many authors suggest that ferrets are poor climbers (Moors 1983; King 1990) or climb rarely (Corbet and Covenden 1980); a specific example is provided here:

“They are strong swimmers and will readily cross waterways to access new habitat (Global Invasive Species Database 2006). They are poor climbers and are not arboreal (Long, 2003).” (p. 6, Markula *et al.* 2009)

Some popular pet books suggest that they are, at the least, good jumpers, if not climbers:

“Carpet sharks [a nickname for ferrets] are notorious explorers and excavators...And they all put their leaping skills to the greatest challenge.” (p. 89, Schilling 2007).

What appears to be true from the published literature is that ferrets tend to prefer prey on the ground, and do not prefer to climb trees to pursue prey.

Powell and Zielinski (1983) discuss competition and coexistence between mustelids. Polecats / ferrets are among the largest of species in the genus *Mustela* (Kowalski 1976).

Ferrets have some predators:

“In the wild, ferrets and polecats are killed by birds of prey such as hawks and owls and large carnivorous mammals such as wolves, lynxes and foxes” (p. 6, Markula *et al.* 2009)

“The Polecat’s ferocity and ability to produce a powerful scent protect it from most of the larger predators (Poole, 1970). Polecats are sometimes killed by dogs and possibly also by foxes (Petzch, 1953), although if a Polecat is attacked it will seize the aggressor’s nose with its fangs, and the Polecat is only likely to be killed if it is caught unawares or if there is more than one attacker (Poole, 1970). Buffon (1847) described dogs fleeing from Polecats. The Polecat’s dense fur and loose skin make it almost impervious to bites. Golden Eagles, *Aquila chrysaetos* and large owls will occasionally attack Polecats (Brehm, 1915; Toschi, 1965; Fozzer, 1982); otherwise man is the chief predator.” (p. 176, Blandford 1987).

Phillips and Shimbo (1990) and Schilling (2007) discuss the aspects of ferrets that make them desirable pets. Ferrets also have some undesirable qualities:

“There are additional notable problems peculiar to ferret ownership. Ferrets have anal sacs and other cutaneous glands in the perianal skin that emit an obnoxious smelling substance, the production of which can be decreased but not entirely eliminated by ‘descenting’ surgery similar to that performed on skunks...surgical neutering is said by some persons to lessen the tendency to bite...Female ferrets are seasonally polyestrous...unless they are bred or neutered, half of females will die from hypoplastic anemia (Ryland *et al.*, 1983). These things, combined with the relatively short life span of ferrets (usually about half that of dogs or cats) are further reasons why ferrets would appear to be less desirable pets than other common pet species.” (p. 21, Constantine and Kizer 1988).

### 8.2.6. Summary and Opinion

Ferrets have some, but not all, of the life history traits of an ideal invader species. The literature is divided on the issue of whether domesticated ferrets can revert to a feral condition and survive in the wild. All of the ideal conditions for establishment of a feral ferret population have not yet been met in California: a moderate climate, a superabundance of preferred prey, a community devoid of competitors and predators, and repeated introductions of large founder populations. Predation and competition from California's wildlife may be important factors that limit the success of the establishment of a feral ferret population. Obviously, sterilized ferrets have no potential to establish breeding populations. Popular pet manuals indicate that the breeding of ferrets, and the ownership of hybrids, are desired by a portion of the pro-ferret community. With or without regulations, the State of California cannot completely prevent the importation of fertile ferrets, polecat-ferret hybrids, or polecats. Thus, some risk of fertile ferrets, hybrids, or polecats establishing feral breeding populations in California still remains; no author or scientist has been able to convincingly enumerate that risk.

### 8.3. ABILITY OF FERRETS TO ESCAPE CONFINEMENT

Ferrets have a natural tendency to explore, to escape confinement, and to cache objects of interest—hence their Latin name “furo” which translates to “thief” in Latin (*L. furis, fur*). Authors such as Lewington (1988) and Wellstead (1981) call ferrets “*animal Houdinis*” (*i.e.* escape artists). Pro-ferret authors often claim that ferrets can be easily contained indoors and will not escape. For example, *Ferrets for Dummies* states that, “*Ferrets are indoor pets and escape is unlikely.*” (p. 65, Schilling 2007). But in another section of this popular pet guide, Schilling (2007) contradicts herself, stating “*Ferrets are master escape artists. They'll try to stick their heads into or through any opening they can get their snouts into. They can and will push open doors with their heads.*” (p. 42, Schilling 2007).

Most authors, including many pro-ferret authors, suggest that it is difficult to confine ferrets or retrieve escapees. Some excerpts follow:

“However, ferrets are very adepts at escaping cages and households (e.g., often through clothes dryer vents), and they can be difficult to find and recapture. Upon realization that one's pet ferret is missing, a major promoter of pet ferrets advises organizing a search of surrounding homes (Morton and Morton, 1985). Thus, if one owns a ferret, one can expect difficulties confining the animal and interaction of the animal with neighbors.” (pp. 18-19, Constantine and Kizer 1988)

“Since ferrets have an inquisitive nature, they try to break out. Escaped ferrets will kill other [lab] animals such as rabbits or guinea pigs” (p. 43, Scharmann and Wolff 1987).

“ ‘If let loose outdoors, 90% [of ferrets] get lost,’ says Dr. Willard B. Nelson, who runs the Exotic Pet and Bird Clinic in Kirkland, Wash. ‘They search out doors, dryer vents and cracks in a house's frame and just go. Once outside they think “Oh wow! This is fun!” Then, when hungry, they can't find their way back home.’ ” (p. 59, Williams 1984)

“Since ferrets have an inquisitive nature, they try to break out [of lab cages]. Escaped ferrets will kill other [lab] animals such as rabbits or guinea pigs” (p. 43, Scharmann and Wolff 1987).

“Their inquisitive nature often leads them to explore new environments and encounter other animals with fervor. (Exceptional care should be taken by the owner and clinician, as this inquisitive behavior in the domestic ferret makes it a great escape artist.)” (p. 700, Boyce *et al.* 2001)

“...throughout the centuries the number of ferrets that have escaped and returned to the wild must be enormous” (Matthews, 1968)

“At first, your home is a scary yet stimulating jungle to a tiny ferret, and she'll be chomping at the bit to find or cause trouble. And believe me, if she's able to find or cause trouble, she certainly will. Carpet sharks [a nickname for ferrets] are notorious explorers and excavators.” (p. 89, Schilling 2007)

“Ferrets are master escape artists. They’ll try to stick their heads into or through any opening they can get their snouts into. They can and will push open doors with their heads.” (p. 65, Schilling 2007).

“Fuzzies are explorers by nature and can cover a lot of ground in only a few seconds....Unfortunately, without the proper restraint, it won’t take your fuzzy long to get beyond your safe reach and into trouble.....I prefer harnesses because ferrets need less time to adjust to these new articles of clothing, and they’re much more secure and safe. As an extra precaution, you should consider fastening an identification tag to your fuzzy’s harness in case he does escape.” (p. 316, Schilling 2007)

“It is completely within the realm of possibility to find a stray ferret” (p. 23, Jeans 1994)

“In California, many stray ferrets are found every year. From 1989 to 1998, 47 stray ferrets from communities in the general Sacramento region of the State were transported to the Department of Fish and Game field station for temporary holding. This represents but a small fraction of what escapes in the State as a whole. Such rescued ferrets are held until transported by volunteers to states where ferrets are legal.” (Jurek 2001)

“Ferrets love to explore. And more often than not, they can get into trouble...Do not assume that an opening is too small for your ferret to get into...For this reason, you must anticipate escapes and ferret-proof your home before letting your ferret out to play....Some danger areas are: holes wider than an inch in diameter.” (p. 40, Jeans 1994)

“Today, ferrets are widely kept as ‘working pets’, animals being offered for sale in pet shops, from market stalls and from numerous ‘back garden’ breeders throughout Yorkshire. Escapees from captivity and from rabbit hunting forays are frequently reported, mainly from the rural fringes of urban and particularly coal mining areas...It is not known how long ferrets survive in the wild. Some are relocated in the same warrens several months after their escape, though animals lost in regularly worked warrens are probably claimed by other ferreters and do not get the opportunity to ‘go wild’. It is strange, however, that there is so little evidence of the establishment of feral populations. In 1890, Graves listed ferrets as part of the Cleveland fauna, though this could merely refer to tame animals being kept in the area. Colin Simms (*pers comm* 1975) has located a viable population in North Yorkshire and in 1975 a white ferret was seen in North Nottinghamshire gravel pit carrying young in its mouth. Elsewhere, feral populations are known from the Isle of Man, Anglesey, Renfrewshire and a population was established on Mull up till at least 1951.” (p. 12, Howes 1980).

In *A Practical Guide to Ferret Care*, Jeans (1994) suggests various elaborate methods for retrieving an escaped ferret, including organizing neighborhood search parties and to “*Go around your neighborhood calling your ferret’s name and squeaking the loud squeaky toy every 15-30 minutes.*” (p. 84, Jeans 1994).

Several authors suggest that unwanted ferrets are released into the environment by irresponsible owners:

“Given the foregoing kinds of difficulties peculiar to ferret ownership, especially biting, many owners try to rid themselves of the animals by (1) returning them to pet shops or other source of acquisition, (2) selling or giving them away, (3) turning them loose, (4) turning them in to animal control authorities for destruction, often accompanied with requests for rabies tests, and (5) not endeavoring to recover escaped animals.” (pp. 21-22, Constantine and Kizer 1988).

“Jean Roush of the United States Humane Society says owners’ ignorance about ferrets is the chief cause behind widespread abandonment of the animals. ‘People see ferrets in pet stores and think the animals are cute, but later find them destructive to furniture. Many people set their ferrets loose and humane societies are getting flooded with the unwanted animals.’” (p. 59, Williams 1984).

“Rescuing the wayward weasel: stray ferrets. Unfortunately, some people will find stray ferrets that are lost or have been abandoned by their previous caretakers.” (p. 61, Schilling 2007).



“Not all releases into the wild are the result of accidental escapes. In 1998, animal-rights activists released 10 ferrets and 161 minks from a Wisconsin facility that provides vaccines for the fur industry. Also, pet ferrets are abandoned by some owners, just as some people abandon rabbits, cats, dogs, and other kinds of pets.” (Jurek 2001)

Several pet manuals suggest that ferrets may be kept outside year-round:

“Your ferret’s house can be a cage, an aquarium, or a small room in the house that has been ‘ferret-proofed.’ You can even let your ferret live outside year round, but if you want to do this, be sure to place the ferret outside for the first time during the summer. Then it will be able to adjust gradually to changes in temperature and cooler weather as winter approaches.” (Morton and Morton 1995)

“The ferret-proof garden. A must for the ferret owner whether dealing with one or many ferrets. Ferrets can get into all sorts of small places and gaps so an asbestos fenced garden with a solid garden gate flush to the paving stone surround is required. Ferrets dig—but the normal asbestos fencing provided it is at least 2 feet in the ground will keep them in. Ferrets climb—so avoid planks, and other objects leaning against the fence at an angle. Ferrets can’t climb straight up trees like a cat but they might get up a trellis. Ferrets jump—from a solid base, so make sure they can’t get onto tops of shed and jump into the neighbour’s pool. It is possible to let the ferret run ‘wild’ in the garden once the above criteria dealt with.” (p. 4, Lewington 1988)

American Pet Products Association, Inc. (2010) lists various categories of where pet ferrets were obtained in 2008, including 2% “*caught outside*”. The exact excerpt is provided here:

Where small animals were obtained—2008. Ferret: 0% “bred at home”; 0% “humane society”; 2% “caught outside”; 12% “friend/relative”; 2% “Internet/online”; 4% “newspaper/classified ad”; 46% “pet store”; 27% “pet superstore”; 4% “previous owner/private”; 5% “other”. (p. 396, American Pet Products Association 2010)

### 8.3.1. Summary and Opinion

The literature indicates that ferrets can and do escape confinement, and that accidental or intentional releases of ferrets into the environment do occur. It does not appear to be possible to completely eliminate the risk of ferrets escaping confinement in California.

## 8.4. REGIONAL CASE STUDIES OF FERAL FERRETS

The popular literature on ferrets often states that breeding populations of feral ferrets exist in North America, but rarely is any evidence given, and none of it appears to be empirical. For example, in a book about animal bites, Nagami (2004) states, “*Escaped European ferrets have established self-sustaining feral populations...*” (p. 222), but Nagami offers no specific cases or literature citations. Following is an anecdotal account of feral ferrets in eastern USA:

“When European ferrets were originally imported into the United States, around 1875, their natural aptitude for ratting made them extremely popular. Many people raised ferrets in their back yards and professionals bred them in large numbers (in fact New London, Ohio, used to call itself ‘Ferretville U.S.A.’ because many thousands of these animals were once raised and sold there). But because ferrets are natural hunters and because they are hardy, they soon became a plague for poultry farmers who were appalled at the ease with which a ferret could learn to love chickens and a life in the woods. So regulations were passed in many states, and the widespread popularity of the species became relatively narrow.” (p. 91, Dolensek and Burn 1976)

Other authors state that ferrets have not established feral populations in North America; such as this excerpt:

“The domesticated ferret, although introduced to North America by the early English settlers some 300 years ago, has not established feral colonies on this continent.” (p.6, Fox 1988).

In Lever (1985)’s checklist of naturalized mammals of the world, no exotic mustelid is listed as having been naturalized in North America. However, the ferret is included among 28 species of exotic mammals listed in the North American mammal checklist of Jones *et al.* (1997):

“Based on information presented by Hoffmeister (1986) and Jones and Schmitt (1997), we have added *Mustela putorius*, European ferret, to the checklist.” (p. 4, Jones *et al.* 1997)

There is a general data deficiency in North America on the persistence of feral, exotic mammals. Even in New Zealand, the statement was made: “*There have been no extensive surveys of ferret distribution in the last forty years*” (p. 185, Clapperton 2001)

Next is presented an analysis of case studies of exotic polecats and ferrets by region. Analysis of these case studies is important because both pro-ferret groups and CDFG have used these case studies as arguments for the inability or proclivity (respectively), of ferrets to revert to a feral condition and establish breeding populations. In a 1986 memo, Eldridge Hunt, CDFG Chief of Wildlife Division, cited many of the following case studies as proof that ferrets would establish feral populations and threaten California wildlife (Hunt 1986).

#### **8.4.1. European Case Studies**

The following excerpts discuss the distribution of (native) polecats in Europe, and issues of population decline and hybridization:

“Most of Europe except for Iceland, Ireland and northern Scandinavia. In Britain the Polecat is now confined to Wales and the adjacent parts of England. It extends eastward only to the Urals.” (p. 182, Corbet and Covenden 1980)

“In the British Isles, the formerly widespread range of the Polecat is currently restricted to Wales and the adjacent English counties (Corbet, 1971; Arnold, 1978, 1984)(Fig. 2). Here the distribution is also increasing in area (Biological Records Centre, unpublished) but largely for reasons different from those suggested for Continental Europe, namely a relaxation of persecution by man (Walton, 1970).” (p. 158, Blandford 1987)

“In Europe from the Atlantic coast to the Urals, north to south-east Norway, south Finland and Sweden, south to the Mediterranean and the Black Sea. Eastward it is replaced by the steppe-polecat, *M. eversmanni*, with considerable overlap in eastern Europe and European Russia. Despite the much repeated statements of Cabrera (1932), does not appear to occur in Africa (Owen 1964). Introduced to New Zealand. In Britain, widespread up to nineteenth century but gradually exterminated over most of country. Apparently never present in Ireland. Last records for Scotland in 1907 (Tetley 1939). Gone from north-west and south-west England by mid-1930’s. Apparently always plentiful in mid-Wales and Herefordshire at least. Now present in all Welsh counties, except Anglesey, as well as Herefordshire, Gloucestershire and Shropshire as a result of expansion from mid-Wales in 1950’s (Walton 1964, 1968b). Records from outside this area need checking carefully because of confusion with feral ferrets. Introductions and escapes from wildlife parks probable in future.” (p. 347-348, Corbet and Southern 1977).

“During the nineteenth century in England, two species of native mustelid—the polecat (*Mustela putorius*) and the pine marten (*Martes martes*)—became extinct, largely because of persecution by gamekeepers (Corbet 1974, Langley & Yalden 1977). In contrast, the stoat and the weasel (*Mustela erminea* and *M. nivalis*), which were killed in even greater numbers, are still common and widespread (Corbet & Southern 1977). We suggest that the theory of life-history tactics offers an explanation for this differential effect, and has implications for contemporary programmes for predator control and for the conservation of declining species in New Zealand.” (p. 619, King and Moors 1979)

“The spread of rabbits and brown rats during the nineteenth century (Corbet 1974) might be expected to have arrested the decline of polecats, but apparently it did not. Either the keeping pressure was great enough to overcome this potential advantage, or some other, unknown, factor was involved.” (p. 621, King and Moors 1979)

“In Europe, *Mustela putorius* occurs from the Atlantic coast in the west to the Urals in the east; north to south-east Norway, south Finland and Sweden; south to the Mediterranean and Black Sea, excluding the Adriatic coast of Yugoslavia and much of the Balkans (Brink, 1967; Corbet, 1978; see also Hagen, 1966; Kumerloeve, 1970; Smolik, 1974; Crucitti & Tringalli, 1984)(Fig. 1). Its range on the continent has extended towards the north, east and south during recent decades and may currently be increasing in area (Walton, 1970). However, densities are



often sparse (Burton, 1980, 1982) and the Polecat is under pressure from land-use changes over much of its range in Western Europe. It has been shown that the spread of the Polecat into Finland from 1880 to 1930 coincided with a long-term change in the climate, which gave rather warmer winters with less snowfall; the number of Polecats caught in Finland dropped to one-tenth of its previous value after the hard winters of 1939-1942 (Kalela, 1940, 1948, 1952; see also Samarasinghe, 1976). Novikov (1962) attributed the northward and eastward migration to the clearing of forests and the extension of agricultural areas; dense forest masses form the northern and eastern limits of the distribution (Heptner, 1964; see also Tatarinov, 1952, Danilov et al., 1973).” (p. 157, Blandford 1987).

“Stoats are now numerous in a wide variety of habitat, and are the commonest and most widely distributed of the introduced mustelids. With no native carnivores in New Zealand, the major control agents are feral cats and even the introduced ferrets. This poses a problem in the 400,000-acre sanctuary established for rare flightless notornis, for neither feral cats nor ferrets are welcome there. The cream-colored ferret is a domesticated descendent of either the Asiatic or European polecat, but can soon revert to its wild form. Established ferally in Europe, particularly in Sardinia and Sicily, it is also plentiful in New Zealand, where there are two types. Called fitches, they resemble either the wild polecat or the domestic ferret and their pelts were prominent for a while in the fur trade. Like the others of their clan, they are expert killers and overcome prey animals far larger than themselves.” (Roots 1976, p. 110)

“In Britain, domestic ferrets were probably introduced for hunting rabbits (*Oryctolagus cuniculus*), possibly by the Normans, or as late as the fourteenth century (Thomson, 1951). Inevitably, some domestic ferrets escaped and may have hybridized with native polecats (*M. putorius*) which were widespread and common at the time. Polecats began to decline around 1850, becoming extinct throughout much of England and Scotland, and reaching a nadir in the years prior to World War I. Along with a number of other British carnivores which survived in relict populations (wildcats, *Felis silvestris*; pine martens, *Martes martes*; Langley and Yalden, 1977; Strachan et al., 1996; Messenger et al., 1997), the near extinction of the polecat was a direct result of persecution by game-keepers (Langley and Yalden, 1977)... The relaxation from persecution, the banning of the gin trap in the 1950s, and the post-myxomatosis increase in rabbit numbers has apparently allowed polecats to expand their range, continuing to the present day where polecats have been recovered as far east as Oxfordshire and Northamptonshire (Birks, 1993, 1995, 1997). In addition, polecats have been covertly re-introduced to parts of Scotland (e.g. Argyll), Cumbria, and southern England.” (p. 156, Davison et al. 1999)

The following excerpts discuss the distribution of feral and domesticated ferret populations in Europe:

“Established feral populations resulting from escaped domestic ferrets are found in parts of Britain, especially on islands (Anglesey, Man, Lewis, Arran) and also on some Mediterranean islands (Sardinia, Sicily). They are not likely to persist as separate, recognizable forms where wild polecats occur....Domestic ferrets are widely kept, especially for the control of rabbits. Feral animals behave as polecats.” (p. 183, Corbet and Covenden 1980)

“Since Ferrets are widely kept, escaped animals may be encountered almost everywhere (Wellstead, 1981), and make it difficult to detect well-established feral populations (Walton, 1977). There are many such populations on islands in the Mediterranean, e.g. Sardinia and Sicily (Brink, 1967). In Britain, feral Ferrets occur, or once occurred, in significant numbers on Mull (Tetley, 1945; Brodie, 1978), Lewis (Cuthbert, unpublished), Bute (Gibson, 1970a), Arran (Gibson, 1970b), and the Isle of Man (Walton, 1977), as well as in several places on the mainland (e.g. Howes, 1980). Ferrets may have been brought to Britain by the Romans but probably arrived later, either with the Normans or possibly as late as the 14<sup>th</sup> century (Thomson, 1951). Introduced ‘ferrets’ are now widespread in New Zealand (Wodzicki, 1950; Marshall, 1961, 1963; Fitzgerald, 1962).” (p. 157, Blandford 1987).

“Feral polecat-ferrets in the British Isles are the result either of escaped albino ferrets breeding with wild polecats, or are escaped dark or parti-coloured animals which man has produced deliberately by crossing the domestic albino ferret with the wild polecat.” (Lever 1985, p.60)

“In Europe, wild populations exist on the Isle of Arran, Isle of Lewis, Isle of Man, Isle of Anglesey; Sardinia, Sicily (in Italy), as well as reported sightings from the Azores (Portugal), the Netherlands, Inner Hebrides, Orkney Isles, Outer Hebrides, Shetland Isles (United Kingdom) and parts of mainland United Kingdom. Some of these populations (e.g. Isle of Man) are thought to have established from escaped domestic ferrets (Varnham, 2005).” (p. 7, Markula *et al.* 2009)

“Just before Christmas there was a reliable sighting of a ferret on northern Chatham Island and another sighting was made a week later about 40 kilometres away. It is not known whether the sightings indicate that a single animal or two or more ferrets are loose on the island. Forest & Bird spokesman Mark Bellingham said if ferrets became established on Chatham Island, it would pose a high risk of extinction of a range of threatened species, including:

- Taiko, the world’s rarest seabird. Only about 100 remain and there are only seven known breeding burrows, all on Chatham Island.
- Chatham Island oystercatcher, the world’s rarest oystercatcher. The population totals about 300 – 85% of them on Chatham Island.
- Chatham Island pigeon, the world’s rarest pigeon. The population has struggled back up to about 200, with 90% on Chatham Island.
- Canterbury buff weka, virtually extinct on the New Zealand mainland but surviving due to its introduction to the Chathams.

Mark Bellingham said the arrival of the deadly predator on Chatham Island was a crisis of international significance, and all efforts must be made to eliminate them. ‘Ferrets are the most dangerous predators of our native birds and the consequences of this incursion could be catastrophic. There have never been ferrets or other mustelids on Chatham Island before and their arrival now is of serious concern.’ The Department of Conservation is aware of the sightings, but attempts to locate the ferrets with tracker dogs or catch them with traps have been unsuccessful. Mark Bellingham said efforts must be made to track the source of the ferrets to determine whether there were one or more ferrets loose, and whether any were female. It is currently the ferret breeding season, and if they breed on the island, numbers could quickly increase. A dog handler should be on stand-by on the island to immediately respond to any further sightings, Mark Bellingham said. He said DOC’s efforts to catch the ferrets were laudable, but responsibility for biosecurity lay with the Chatham Islands Council, which was not adequately funded to deal with serious biosecurity incursions.”

(Anonymous. 2008. Ferrets sighted on the Chatham Islands could spell disaster for some of the world’s rarest birds. WildlifeExtra.com. <http://www.wildlifeextra.com/go/news/chatham-ferrets.html#cr>)

“On the island of Mull off the west coast of Scotland, where the polecat has never been indigenous, ferrets and polecats were both kept in domestication in about 1933-4; they soon escaped and interbred freely in the wild, before long becoming pests throughout the island where they preyed on rabbits, ground-nesting wild birds and domestic poultry. The well-known Scottish naturalist and author, Seton Gordon, recalls that polecat-ferrets were set free on the island of Harris in the Outer Hebrides to control rabbits where, in Mr Gordon’s opinion, they were responsible for exterminating the ptarmigan (*Lagopus mutus*) the Hill of Clisham—its last haunt in the Outer Hebrides. From Harris they spread to the northern part of the island (known as Lewis), where they are said to be especially common around Uig. There are also thriving populations on the Scottish islands of Arran and Bute, on the Isle of Mann in the Irish Sea and on the Isle of Anglesey off the coast of north Wales, as well as in Renfrewshire and parts of Yorkshire...Feral ferrets are established in the wild in many places in continental Europe, being especially common, accord to Roots (1976), in Sicily and Sardinia.” (pp. 60-61, Lever 1985).

“Since ferrets are widely kept, escaped animals may be encountered anywhere and make it difficult to detect well established feral populations. However, these appear to exist on the Isle of Man, Anglesey, in Renfrew and in parts of Yorkshire. Such a colony once existed on the island of Mull (Tetley 1945) and animals may still be there although 1951 was the last year that one was recorded. Other Scottish islands, however, seem to have thriving colonies, including Lewis (Cuthbert, unpubl.), Arran (Gibson 1970b) and Bute (Gibson 1970a).” (p. 352-353, Walton 1977)

“The rate of range extension for *M. putorius* has been documented in Finland, where between 1880 and 1940 it spread from the Karelian Isthmus north to central Ostrobothnia and west to the Gulf of Bothnia at a rate of 7.5 km per year or 750 km per century (Kalela cited in Kurten 1957). A similar rate can be postulated for the spread of ferrets during the Pleistocene when conditions were favorable.” (p. 18, Anderson 1989).

“Seabird species were abundantly present in Sao Miguel, Santa Maria, Terceira, Graciosa, Sao Jorge, Flores and Corvo at the time of colonisation, namely Manx Shearwater *Puffinus puffinus* and Bulwer’s Petrel *Bulweria bulwerii*. According to these historical chronicles past threats include intensive human exploitation and habitat deterioration. The significant decline in the abundance of these species in the XVI century is mentioned and related to predation by ferrets *Mustela furo*....In the Azores, the past and present occurrence of predators such as *Rattus rattus*, *Rattus norvegicus*, *Felis catus*, *Mustela nivalis* and *Mustela furo* has had a profound impact in the populations of seabirds, depriving ground nesting birds of using otherwise suitable breeding sites.” (p. 16, Pitta Groz *et al.* 2002)

“Distribution: Since ferrets are widely kept, escaped animals may be encountered anywhere and make it difficult to detect well established feral populations. However, these appear to exist on the Isle of Man, Anglesey, in Renfrew and parts of Yorkshire. Such a colony once existed on the island of Mull (Tetley 1945) and animals may still be there although 1951 was the last year that one was recorded. Other Scottish islands, however, seem to have thriving colonies, including Lewis (Cuthbert, unpubl.), Arran (Gibson 1970b), and Bute (Gibson 1970a). They are widespread in New Zealand.” (p. 352-353, Corbet and Southern 1977)

“In the Azores, populations of Bulwer’s petrel (*Bulweria bulwerii*) and Manx shearwater (*Puffinus puffinus*) have been significantly reduced by ferrets. Currently, ongoing predation by introduced rats, ferrets, cat and dogs prevents the majority of seabird species from breeding on the main islands (Monteiro *et al.* 1996).” (p. 8, Markula *et al.* 2009)

The ferret is apparently mentioned by Strabo in 1st Century BCE as having been introduced into the Balearic Islands to counter a plague of rabbits (Thomson 1951).

The following is an account of a British attempt to introduce mustelids to another island:

“As early as 1654 black rats (*Rattus rattus*) were a serious pest on some of the French islands in the West Indies...In an attempt to combat these depredations Sir Charles Price, Bt, introduced some ferrets (*Mustela furo*) from England in about 1750 which were, however, apparently rendered ineffective by attacks from chigoes (*Tunga penetrans*), a form of burrowing flea also known as chiggers or jiggers. A year or so later Price apparently made a second attempt with some unknown species of mustelid from South America, which was called by the natives the ‘Charley Price Rat’, but this, too, was unsuccessful.” (p. 676, Lever 1985).

#### 8.4.1.1. Summary and Opinion

The European case studies are extremely complex because Europe is in the heart of the range of both the ferret and the polecat. Domesticated ferret populations appear to be among the mustelids successfully introduced onto various islands, primarily for rabbit control. The exact genetic makeup of these populations is not certain, and may vary by region. It is not clear whether the American domesticated pet ferret can be directly compared to these European populations, and whether they can be assigned the same risk of establishment and adverse impact upon the environment.

#### 8.4.2. New Zealand Case Study

King (1984b) should be consulted for a thorough discussion of the natural history of New Zealand in relation to exotic predators. The following excerpt describes the early New Zealand landscape:

“New Zealand has a spectacular history of introductions of exotic vertebrates. Before human settlement there were only two indigenous land mammals, both bats, but successful colonizations have expanded the current list to 35 species (Gibb & Flux 1973). Similarly, the 149 species of indigenous breeding birds have been supplemented by the establishment of 33 introduced species (Williams 1973). Many other mammals and birds were released but failed to become established. The majority of introductions took place in the second half of the last century

(Thomson 1922, Wodzicki 1950), mostly because the early European colonists were keen to recreate the faunal atmosphere of their homelands....Three species of European rodent arrived by chance, and colonized New Zealand in several stages between about 1770 and 1890 (Atkinson 1973, Taylor 1975). In contrast, three mustelid carnivores were released intentionally in the 1880s in an unsuccessful attempt to control rabbits *Orcytolagus cuniculus*. Both rodents and mustelids spread rapidly once they arrived. Naturalists soon reported that these predators were killing both indigenous and introduced birds, and some people claimed them responsible for serious declines in the numbers and distributions of many native birds.” (p. 137, Moors 1983)

Laycock (1966), citing the work of Dr. K. Wodzicki (Department of Scientific and Industrial Research), stated that as many as 207 vertebrates may have been introduced into New Zealand, and at least 91 have become established. According to King (1990), the first ferret introductions into New Zealand occurred in 1879, the ferret was well established by end of 19<sup>th</sup> century, the first control programs began in 1930, and now New Zealand has the world’s largest population of feral ferrets.

Lever (1985) gives a detailed account of the introductions of weasels, stoats, and ferrets into New Zealand from the 1860’s to the end of the 19<sup>th</sup> century to control rabbit populations. By the 1940s, all three mustelids were established and widespread, but not evenly; stoats were “especially widespread”, weasels were “more locally distributed”, and ferrets were “restricted” (Lever 1985). The exact quote from Lever (1985) is as follows:

“Ferrets seem to have always had a restricted range in New Zealand. Wodzicki reported them to be rare or absent in the North Auckland peninsula from Kaipara harbour northwards, in the eastern part of the Bay of Plenty, on the east coast generally and in Poverty Bay, in large areas of Taranaki, in west Nelson and along the whole of the western coast of South Island. Elsewhere they were locally distributed on both main islands, preferring dry bush, paddocks, dried-up riverbeds and open tussock land: being poor tree-climbers their range is apparently largely governed by the distribution of rabbits.” (p. 62, Lever 1985).

Stoats are often considered better hunters, and more successful, in New Zealand (e.g. Jeffares 1986; Palmer 1898); Wodzicki (195) states that stoats are the most widely distributed of the mustelids found in New Zealand, and that ferrets were “restricted” in their distribution. King (1989) states:

*“Both survived and spread, and now, over a hundred years later, stoats are present in virtually all forested areas. Common weasels, originally imported in much greater numbers, are now among the rarest of all New Zealand’s mammals.”* (p. 209, King 1989).

“Implications for predator control and conservation in New Zealand. The two species which most successfully resisted the attentions of the English gamekeepers have both been introduced here, and the stoat is now very common in all forests, including all National Parks. The Parks are among the most important reserves for the conservation of our remaining native birds, and the reduction (or, if possible, extermination) of stoats in them is considered a highly desirable aim by the National Parks Authority...First, it is clear that control of stoats or weasels by trapping is unlikely to be successful except locally and temporarily.” (p. 621, King and Moors 1979)

The following excerpts discuss the establishment, and later attempts to control, polecats and ferrets in New Zealand:

“Most of the deliberate releases of these aggressive small mustelids, and the related polecat and domestic ferret, were as biological controls, mainly to combat rabbits, mice and rats. None accomplished even this primary task with success, and they destroyed far more than just vermin. The introduction of the weasel and ferret into New Zealand—and foxes, cats, dogs, and other carnivores into many countries—cannot under any circumstances be considered successful. They all failed to control the pest species and caused much heartache with their own depredations on native animals.” (Roots 1976, p.108-109)

“Adult ferrets have few predators in New Zealand except man.” (p. 328, King 1990)

“All three [stoats, weasels and ferrets] are members of the mammalian order Mustelidae, which also includes the badgers, otters and skunks. They were introduced into both New Zealand and Australia almost a century ago to control the rapidly spreading rabbits. The ferrets, domesticated and therefore ready breeders in captivity,



benefited from official breeding programmes. Set up in 1897 they aided their production, availability, acclimatization and spread...Their dubious benefits as pest controls, and their small value as fur bearers, were far outweighed by their predation of native animals.” (Roots 1976, p. 109)

“The first attempt to control ferrets was by a system of bounties, administered by the acclimatization societies and encouraged by the export of dried pelts (Wodzicki, 1950). Feral ferrets would, in theory, be as vulnerable to trapping as the polecat in Britain, which was intensively trapped by gamekeepers, to the point of extinction in lowland England (King & Moors, 1979a); but conditions in New Zealand are too different (the country is far less accessible, and the number of trappers too few) to achieve the same effect on a very large scale. Local problem ferrets attacking the endangered black stilt (*Himantopus novaezelandiae*) in the Mackenzie Basin, and chicks of the royal albatross (*Diomedea epomophora*) at Tararua Head, Ontario, have been trapped for years, but are always replaced from outside the trapped area (King & Moors, 1979a, Pierce, 1982). The combined effects of predator-exclosure fences and intensive local and seasonal trapping have improved black stilt nesting success (Pierce, 1982), but many nests are still exposed to predation. The use of specific scent lures may increase the effectiveness and efficiency of trapping for ferrets (Clapperton, 1985; Clapperton, Minot & Crump, 1989), but other predators (cats, Norway rats) remain. Elsewhere, the ferret apparently presents little threat to New Zealand wildlife.” (p. 329, King 1990)

“The Polecat was introduced to New Zealand during the 19<sup>th</sup> century, together with the Ferret, in an attempt to control rabbits. The first animals arrived before 1870, and many thousands were shipped over from London and set loose between 1882 and 1884. Although referred to as Ferrets, it is unlikely that all were domesticated, and some wild individuals from the continent were probably included (McCann, 1956). With little competition from native animals, the introduced mustelids spread and established themselves as permanent members of the fauna (Walton, 1977), and a definite New Zealand type now exists (McCann, 1956).” (p. 158, Blandford 1987)

Clapperton (2001) reviews the methods and efficacy of ferret control in New Zealand. Ironically, one of the most effective means of controlling ferret populations is to reduce rabbit populations (Clapperton 2001). According to King (1990) and other authors, ferret populations were regulated by prey abundance, primarily rabbits:

“Ferrets are generally much less abundant now than in the era (1880 – 1950) of massive rabbit numbers throughout the country (Marshall, 1963).” (p. 328, King 1990)

“New Zealand has the largest known population of feral ferrets, so conditions here must suit them well. During the era of greatest abundance of rabbits, where food was virtually unlimited, the breeding and survival rates of wild ferrets were probably much higher than recorded now, since about 1950 the numbers, and presumably also the reproductive and mortality patterns (though not, apparently, the general distribution) of feral ferrets have adjusted to a lower food supply. The earliest releases included many individuals with unnatural coat colours bred up by artificial selection during domestication, but most of these have reverted to the wild-type coloration similar to the polecats.” (p. 328, King 1990)

Dowding and Murphy (2001) reviewed the status of New Zealand’s endemic shorebirds and impacts upon them, especially exotic mammal predation. Mustelids are implicated in the decline of several bird species, but the majority of case studies and examples involve rats or cats, or habitat loss or other anthropogenic agents such as rabbit control. Dowding and Murphy (2001) theorize that because shorebirds, and ground-nesting birds in general, in New Zealand evolved without mammal predators, they are particularly vulnerable to mammal predation. According to Dowding and Murphy (2001), cats, ferrets, and stoats are predicted to be the greatest future threat to remaining endemic shorebirds in New Zealand.

There is no doubt that non-native mammals have severely impacted the native fauna of New Zealand. That portion of the impact attributable to polecats and ferrets is not as clear. Some excerpts explain the situation:

“The impact of feral ferrets on the New Zealand environment is difficult to assess. They failed to deal with the rabbit problem, since in the country generally the numbers and distribution of rabbits controlled those of the ferrets, not vice versa (Marshall, 1963; King, 1984a). However, where conditions favour the predators at the

expense of the prey, e.g., in a fenced enclosure, predation by ferrets and cats can be responsible for a huge reduction in rabbits...These ferrets may, at times, survive largely on other prey, but whether they have any effect on native fauna (e.g., birds) is unknown (Fitzgerald et al. 1984).” (pp. 328-239, King 1990)

“The suspicion that ferrets were having an adverse effect on our native fauna has now been confirmed for a number of species.” (p. 195, Clapperton 2001)

“The Polecat was introduced to New Zealand during the 19th century, together with the Ferret, in an attempt of control rabbits. The first animals arrived before 1870, and many thousands were shipped over from London and set loose between 1882 and 1884. Although referred to as Ferrets, it is unlikely that all were domesticated, and some wild individuals from the continent were probably included (McCann, 1956). With little competition from native animals, the introduced mustelids spread and established themselves as permanent members of the fauna (Walton, 1977), and a definite New Zealand type now exists (McCann, 1956).” (p. 158, Blandford 1987)

“It is possible that the original introductions included genuine wild polecats (*M. p. putorius*) as well as ferrets.” (p. 323, King 1990)

“Predation by feral cats *Felis catus*, stoats *Mustela erminea* and ferrets *Mustela furo* is the principal cause of Yellow-eyed penguin *Megadyptes antipodes* (hoiho) chick mortality on South Island, New Zealand.” (p 187, Alterio et al. 1997)

“In New Zealand, ferrets are a potential conservation threat, as they prey on many endangered or threatened endemic wildlife species, including black stilts (*Himantopus novaezealandiae*) (Pierce 1982), banded dotterels (*Charadrius bicinctus*) (Rebergen 1993), yellow-eyed penguins (*Megadyptes antipodes*) (Ratz et al. 1992), and royal albatrosses (*Diomedea epomophora*) (Lavers & Clapperton 1990). Recently, there has been concern over the role that ferrets may play in spreading *Mycobacterium bovis* (bovine Tb) to cattle and deer.” (p. 363, Smith et al. 1995)

“New Zealand’s alien mustelids failed to achieve more than a limited control over the country’s introduced rabbit population; instead, they found the native birds to be much easier prey, since they were not pre-adapted to avoid predators as were the rabbits and other—all introduced—mammalian species...” (p 62, Lever 1985).

“Stoats are not the only introduced predators in New Zealand, and in certain habitats are not the most important. On pastoral land another mustelid, the feral ferret (*Mustela putorius furo*), is more common, and on offshore islands the worst pests are undoubtedly rats. The ferret is a domesticated strain of the polecat, and the two forms may well have similar life-history tactics. There are few data on the trapping of ferrets other than the figures given by Wodzicki (1950) for sales of ferret pelts bought from rabbit trappers during the 1940s. There is no way of estimating the ecological effect of this harvest, which has anyway greatly decreased since the regional Rabbit Boards have managed to control most rabbit populations. However, ferrets remain locally common and a potential nuisance, for instance at the albatross breeding colony at Taiaroa Head, near Dunedin. The decline in Britain of polecats, at least partly as a result of keeping, suggests that ferrets might be easier than stoats to control by trapping. However, the surest way to reduce the numbers of ferrets is to control their staple food, rabbits (Gibb & Flux 1973).” (p. 622, King and Moors 1979)

“General Impact. In their introduced range, ferrets (*Mustela furo*) threaten a variety of native wildlife, for example, ground nesting and flightless birds in New Zealand (DOC 2005; Norbury 2001; Clapperton 2001). They have also contributed to the decline of seabird populations on the Azores (Pitta Groz et al. 2002), and reduced bird populations in the Scottish isles (Lever 1985; Corbett and Southern 1977). Ferrets are also a known vector for bovine tuberculosis (*Mycobacterium bovis*), which is present in reservoir populations in the introduced brushtail possum (*Trichosurus vulpecula*) in New Zealand (de Lisle et al. 2002). Bovine tuberculosis can be transmitted by direct contact or via contamination of pasture and food (Ragg 1998). In Europe ferrets are sympatric with wild polecats and there is a danger of hybridisation (Davison et al. 1999).” (USGS 2008)



“The actual impact of these predators [weasel, stoat, ferret, cat] is difficult to assess. It is relatively simple to identify the foods that are taken, but much more difficult to tell if this predation is affecting the population of the prey species.” (p. 12, Fitzgerald *et al.* 1984)

“Study the following four statements and decide, before reading further, whether or not you agree with each. (1) The native animals and birds of New Zealand evolved in a land free of all predators; they adapted to life on the ground because they never needed to fear meeting a hungry hunter. (2) The main reason for the decimation of our native species in the last thousand years is that they were incapable of defending themselves from various exotic predatory animals which accompanied the human colonists—both Polynesian and European—to New Zealand. (3) Introduced predators are now widespread on the mainland; they still kill and eat native animals and birds, and must affect their numbers; so they should all be controlled, especially in major wildlife sanctuaries such as the National Parks. (4) Of all the predatory animals brought here, by far the worst are the mustelids (a collective term for stoats, weasels and ferrets), and if it were possible, these should be not merely controlled, but exterminated on all protected lands. If you agree strongly with all four statements, you are in good company, since most other conservationists would too; but would be wrong. There are good reasons for giving only qualified assent to the first and second propositions, and the third and fourth reflect opinions which are very widely and ardently held among birdwatchers, but which are largely untrue.” (p. 11, King 1984)

“So, surprising as it may seem, mustelids cannot be proved to be directly responsible for any of the shockingly long list of island populations of birds that we know to have become extinct since the human colonisation of New Zealand, and they can be suspected of finishing off only a handful of South Island species and, perhaps, the huia. By contrast, the record of cats is very black, and of man and rats worse still. This is not to say that the mustelids were not capable of inflicting as much damage, or more: it simply that they did not have the opportunity. The worst damage is always done by the first predators to arrive, which were usually men in boats (canoes or sailing ships) and the animals that they carried with them.” (p. 14, King 1984)

In his study on the impact of predation upon birds (native and naturalized), Moors 1983 made the following observations and conclusions:

“Mustelid predation at Kowhai Bush were probably all the work of stoats and weasels. Ferrets *Mustela furo* also inhabit the Bush, but they climb only rarely (Corbet & Southern 1977). Weasels are much less common than stoats in New Zealand (Marshall 1963) and very few were observed or trapped at Kowhai Bush. Stoats were sighted regularly but their numbers could not be estimated...Nevertheless, these few mustelids were able to inflict heavy losses on eggs and nestlings, probably because they became experienced and specialized predators of such prey (Ewer 1973). Elsewhere in New Zealand avian prey are also an important component of the spring diet of stoats and weasels. For example, remains of birds and eggs were found in the guts of 41.4% of 169 stoats collected in spring from forests (King & Moody 1982).” (p. 150, Moors 1983)

“Since European settlement the endemic land birds have undergone a dramatic decline in numbers, diversity and distribution...The three main reasons put forward to account for this dismal record are the modification of vast areas of habitat, especially forests, the arrival of mammalian predators and the introduction of new diseases. Since the early 1800s roughly two-thirds of New Zealand’s native forests (which originally covered about 66% of the country) have been destroyed (Mills & Williams 1978)...Clear-felling reached a peak of activity during the final quarter of the last century, coinciding then with the establishment of new and skilful predators [namely ship rats (Atkinson 1973) and mustelids (Wodzicki 1950)], the introduction of alien birds (Thompson 1922), and the possible presence of novel avian diseases (Myers 1923). These decades also coincide with major declines in many of the endemic birds (Mills & Williams 1978). For most species it is now virtually impossible to identify the precise parts played in these declines by loss of habitat, predators and disease because, except for a few species, the relevant contemporary data are lacking. In any case, the impact of these three factors probably varied from one species to another. The destruction of habitat and its modification by introduces browsing mammals must, however, have had a serious effect, if only because they forced a reduction in the abundance and distribution of

the birds; and they may also have made the populations more susceptible to other influences, such as competition from introduced birds (see Diamond & Veitch 1981).” (p. 151, Moors, 1983)

“At present the bulk of the case against introduced predators rests on circumstantial and inferential evidence. It is not sufficient to show merely that predators kill many birds or plunder many nests—the crucial point is whether losses from predation cause annual mortality to exceed annual recruitment. Only when this happens can predators correctly be blamed for causing a population decline....Although the circumstantial evidence is damning, this direct relationship between predation and decline (and ultimately extinction) has rarely been demonstrated in New Zealand....In any event, it is unlikely that introduced carnivores would have had the same blanket effect on all the native avifauna.” (p. 152, Moors, 1983)

“The New Zealand region contains about 11% of the rare and endangered bird species listed in the IUCN Red Data Book (Mills & Williams 1978)....Introduced rodents, mustelids and cats have undoubtedly had a serious impact on the New Zealand avifauna. But it is not merely pedantic to question the role which this impact has played in causing extinctions, both historically and at the present time. Only if the effect of these predators on their avian prey is understood in some detail can we know if predator control is justified (either biologically or economically), whether predators threaten a particular species, and if they do, how best to protect it. Furthermore, unquestioning concentration on the current impact of predation may mean that other and perhaps more dangerous influences, such as habitat destruction, are put to one side.” (p. 153, Moors, 1983)

Ironically, New Zealand has allowed the breeding of ferrets to stimulate its fur trade:

“The skins of ferrets have, in the past, been valuable in the fur trade. In 1948, at least 4904 superior and first class New Zealand fitch skins were offered for sale...However, skins collected from the wild are less reliable, in quality and supply, than those purpose-bred. Hence, fitch farming is a developing industry, and New Zealand is now one of the main world suppliers of fitch pelts...In 1985, 100,000 fitch skins were exported from New Zealand...In 1986, there were about 127 registered farms (R. Williams, unpubl.), the earliest were stocked with feral animals collected locally, but later ones imported superior stock from Scotland and Finland. Permission to import them depends on the argument that escapees would do no more than temporarily add to the existing population of feral ferrets, and hence the fitch fur industry has no actually or potentially deleterious environmental effects. This argument is accepted by MAF, despite occasional protests from conservationists. The number of ferrets imported was high at first, declining as the imported ferrets became self perpetuating: 2436 in 1982, 1195 in 1983, 1479 in 1984, 0 in 1985 (MAF, unpubl.). However, the importation of other carnivores (e.g., mink) is strictly prohibited; mink look similar to ferrets but have a very bad record of damage to the native biota in countries where they have escaped from fur farms. All ferrets imported into New Zealand are carefully checked to ensure there are no mink among them.” (pp. 329-330, King 1990)

Jeffares (1980) also discusses the burgeoning the use of ferrets in fur production in New Zealand. Clapperton (2001) states:

“The recent spread of ferrets into some of these areas may have been aided by the establishment and subsequent failure of the fitch farming industry. During the 1980s there were 17 fitch farms in Northland, and now there are none (Northland Regional Council, unpubl. data). Many of the isolated ferret records from Northland have been from the vicinity of former fitch farms, and it is suspected that these animals escaped or were liberated (Pierce 1996)....There is also the concern that the pet trade may be widening the distribution of ferrets. For example, a neck-collared ferret was caught on Mauao (Mt Maunganui) in late 1999. It is believed that farmed ferrets were released near Matawai, in the East Cape district, in or around 1984, coinciding with a crash in the local weka (*Gallirallus australis greyi*) population.” (pp. 186-187, Clapperton 2001).

In 2001, the Department of Conservation’s Chief Technical Officer Geoff Hicks declared ferrets unwanted organisms under the Biosecurity Act. In 2002, the law was changed to ban the sale, distribution and breeding of ferrets; this did not apply to existing pets.

#### 8.4.2.1. *Summary and Opinion*

The New Zealand case study is very complex. Domesticated ferrets appear to be among the mustelids intentionally and repeatedly introduced in the late 19<sup>th</sup> century for rabbit control; ferrets may also have been accidentally released from fur farms. Feral, breeding populations of *Mustela putorius sensu lato* have apparently existed in New Zealand for over a century; the exact genetic makeup of these animals is not certain, and may vary by region. It is not clear whether the American domesticated pet ferret can be directly compared to these New Zealand populations, and whether they can be assigned the same risk of establishment and adverse impact upon the environment.

#### 8.4.3. **Australia Case Study**

Bomford and Hart (1998) report the following tally of introduced species in Australia:

“...about 20 mammals, 30 birds, 20 freshwater fish, several amphibians, 500 invertebrates, and 1,500 plants—which are pests of agriculture and/or the environment.” (p. 406, Bomford and Hart 1998)

Bomford and Hart (1998) go on to state:

“There is a risk that new imported species, or exotic species that are currently kept in private collections and zoos, could escape and become pests...Ferrets have established wild populations in New Zealand and have had highly detrimental effects on wildlife. Yet ferrets can be kept without any permits or restrictions in Australia, and a wild population has now established in the Australian island state of Tasmania.” (p. 406)

Australia has apparently not been impacted by polecats and ferrets as has New Zealand:

“It is estimated that up to 150,000 domestic ferrets are kept as pets in Australia (Olsen & Jensz, 2005). There are ten ferret welfare societies and clubs in Australia (located in every state except the Northern Territory) (Oz Ferret, 2008). Small numbers of wild (feral) ferrets have been seen at South Arm, Tasmania, where efforts to detect a naturalised population have so far failed (M. Statham pers. comm., DPIW TAS, 2006). Small numbers have also been seen in the southwest of Western Australia (Western Australian Museum, 2003). However, a wild population has not been confirmed. There is anecdotal evidence that a small population of feral ferrets has managed to persist for many years in a small area of forest near Inglewood (southern Queensland) (J. Mitchell, pers. comm.). This population may have existed since the first rabbit plagues, when professional rabbit hunters used ferrets to hunt rabbits. Occasional sightings of lone ferrets have also been reported from various parts of north Queensland, such as near Townsville and Cairns (J. Mitchell pers. comm., R. Hynes, pers. comm.). However, these could be escaped pets and a naturalised population has never been confirmed... Ferrets have naturalised in New Zealand (both North and South Islands)...” (p. 7, Markula *et al.* 2009)

“If ferrets ever naturalise to fill their full potential range in Queensland, their primary impact is likely to be as a new predator of small to mid-sized native animals, such as possums, bandicoots, birds, bird eggs, lizards, frogs, fish and invertebrates. As has occurred in New Zealand, ground-dwelling or ground-nesting birds are particularly at risk.” (p. 9, Markula *et al.* 2009)

Forsythe *et al.* (2003) developed a computer model to analyze the success or failure of vertebrate introductions into Australia. They determined that for both mammals and birds, species were more likely to successfully establish where they had wide climate tolerance or that the climate of their native range matched that of Australia, where they had been successfully introduced elsewhere, where more effort had been put into their introduction, and where the body size was small and reproduction rates fast. They concluded:

“Although the above factors have useful explanatory value, the outcome of any one introduction can remain difficult to explain. For example, the polecat-ferret (*Mustela putorius furo*) has a close climate match with Australia. Despite this, and the fact that it must have been deliberately and inadvertently introduced many times, this species has failed to become established. Releases of the species in Australia have mostly involved animals from the domestic end of the pole-cat spectrum, and it may be that domesticated forms are less likely to establish wild populations than undomesticated polecats. Releases in New Zealand, where the species has established a wild population, included polecats (Blandford 1987). Alternatively, factors unrelated to introduction effort and climatic suitability may be important. One possibility is that ferrets exhibit inappropriate antipredator behavior

towards foxes and are quickly preyed upon (Georges 2000). The ferret has established widespread populations in New Zealand, where there are no larger predators.” (p. 566, Forsyth *et al.* 2003)

#### 8.4.3.1. *Summary and Opinion*

Instances of stray or feral ferrets have apparently occurred in Australia, but there is little evidence of the establishment of any feral breeding population. The reference to a breeding population in Tasmania could be investigated further. Some scientists express a concern over the possible establishment of mustelids in Australia. Nationally, Australia apparently does not ban the importation or possession of pet ferrets.

#### 8.4.4. **Arizona Case Study**

Ferrets are listed in the *Introduced, Nonnative Mammals* section in the Arizona state checklist by Hoffmeister (1986):

“*Mustela putorius* Linnaeus—European Ferret

European ferrets, sometimes referred to under the name *Mustela furo*, are frequently sold as ‘pets’ in some stores. However, Pat O’Brien informs me (letter of 1984) that they occur in the wild in various places in Cochise County. On May 8, 1972, a ferret was seen near a farm pond in the Kansas Settlement area east of Willcox Playa. Again on June 16, 1975, one was sighted within a few miles of the earlier observation. On February 19, 1984, one was retrieved at the city limits of Sierra Vista. This is nearly 50 airline miles from earlier sightings. The presence of this ferret in a wild condition in Arizona should be of grave concern to ecologists and conservationists.” (p. 559, Hoffmeister 1986)

On the Jurek and Ryan (1999) questionnaire, agency personnel from the Arizona Game and Fish Department Non-game Division answered as follows:

Do you have evidence of the following?

Cases of stray individuals in urban areas: Sporadic.

Free-living individuals documented as surviving more than a few days in wild: No.

Breeding suspected in the wild now: [blank] or in the past: No.

Breeding individuals documented in the wild now: No or in the past: No

An established breeding population of domestic ferrets in your state: “has been reported, but not confirmed as existing”

Environmental Concerns: Arizona recently initiated a reintroduction program for black-footed ferrets (*Mustela nigripes*, BFF). The establishment or release of pet ferrets with the expected range of BFFs is a concern.”

In the CSUS questionnaire, Diane Eckles (Chief, Office of Environmental Health, Arizona Department of Health Services) answered “Don’t know” to questions regarding the existence of abandoned ferrets, feral populations, or the harassment of livestock or wildlife. Holly Hicks (Small Mammal Biologist, Arizona Game and Fish Department), answered “*Don’t know*” to questions regarding the harassment of livestock or wildlife, answered “*Don’t know exactly, but my professional estimate is 10 to 100 ferrets*” to the question of abandoned or stray ferrets in Arizona, and answered “*No, or probably not*” to the question of established feral populations in Arizona.

#### 8.4.4.1. *Summary and Opinion*

Instances of stray or feral ferrets have occurred in Arizona, but there is no evidence of the establishment of any feral breeding population. Arizona agency personnel have previously expressed concern over the possible establishment of ferrets in their State, but this concern was not expressed concern in the CSUS questionnaire.

#### 8.4.5. **New Mexico Case Study**

A 1984 memorandum from the New Mexico Department of Game and Fish documented a man that released 3 ferrets into the wild in an attempt to control prairie dogs on his property. In 1987, the Village of Corrales Animal Control Department live-trapped 1 of 2 ferrets that had entered a residence; in that same year, pet dogs killed a ferret in a backyard. There were anecdotal accounts of feral ferrets in New Mexico, such as the following:



“There are some serious threats of the spread of other exotic species in the United States in general and in New Mexico in particular. For example, *Mustela putorius* (European ferret) has been documented to occur in the wild now in Arizona (Hoffmeister 1986), some of these mammals have been killed by hunters in Mississippi (Cheri A. Jones, pers. comm.), and there are reports of this species that may represent established populations in New Mexico (NMDGF, unpubl. data).” (p. 201, Jones and Schmitt 1997)

“New Mexico: Feral ferrets were reported in the 1980s in several locations in New Mexico, mainly the result of legal, purposeful releases of ferrets in prairie dog towns as a biological control method. The following letters dated October 7, 1987, October 27, 1987, November 6, 1987, and August 2, 1989, were provided by New Mexico Department of Game and Fish to representatives of two ferret organizations in reply to survey letters requesting or clarifying information on the occurrence of feral ferrets in New Mexico. None of these reply letters was included in the California Domestic Ferret Association report. Instead, a copy of a California Domestic Ferret Association survey letter of August 11, 1989 to New Mexico Department of Agriculture, with a reply marked on it, was included as that state's response. As in the Alaska instance, this letter was tallied in that report as being one of the 46 replies from ‘State Departments of Fish and Game (or equivalent)’.” (Jurek 2001).

In a letter to W. Phillips (California Domestic Ferret Association), Harold Olson (Director, New Mexico Department of Game and Fish) stated:

“...With regard to your question concerning the possible existence of feral populations of the species in the state, the answer is affirmative. Based on our most recent information, small populations of feral ferrets occurred as recently as the early 1980's in the Clovis, Roswell, and possibly Farmington areas. These ferrets were typically in or near areas having colonies of black-tailed prairie dogs (*Cynomys ludovicianus*). We have no information on the numbers of ferrets in those areas or whether the animals persist at present....In closing, let me assure you that European ferrets are a concern of ours in New Mexico—especially in regard to negative impacts that they might have on native wildlife. For example, their occurrences in prairie dog towns could well pose a threat to the black-footed ferret (*M. nigripes*), including in competition for prey. In addition, European ferrets are capable of competing with other species including native carnivores such as weasels and foxes. European ferrets also have the potential for causing harm by preying on native wildlife and domestic animals. In fact, we know of ferrets having been killed while attempting to kill domestic chickens in the Santa Rosa area. Finally, European ferrets may transmit diseases to native wildlife, including rabies and distemper. If the species were not already established in the commercial trade and as pets in New Mexico, there would be every reason to ban their importation, sale, and possession in the state.”

A letter was written to Phillips by John Hubbard (Assistant Chief for Endangered Species, New Mexico Department of Game and Fish) on October 27, 1987, who stated:

“In essence, if we did not already have ferrets in the state, we would probably endeavor to keep them from being kept here as pets. However, this is a moot point, as the animal is already here and is likely to stay. Finally, I hope that you can sympathize with the California Department of Game and Fish [sic] in its efforts to conserve the considerable biological diversity that historically occurred in your state. Not only have millions of people swarmed over the areas occupied by that area's wildlife, but many other problems have arisen. One of these has been the introduction of exotic wildlife, including both invertebrate and vertebrate animals. One cannot blame the department for wanting to remove additional risks to native wildlife by banning as many exotics as possible, including the domestic ferret.”

A second letter was written to Phillips by John Hubbard (Assistant Chief for Endangered Species, New Mexico Department of Game and Fish) on November 6, 1987:

“I am sorry that confusion has arisen over information that I supplied in my letter to you of October 27, 1987. Actually, there is no contradiction in the items that you cite in your letter. The answer is indeed affirmative that we have had reports of ferrets living ferally in New Mexico, these sites having been identified for you in the copy of our letter to Mr. Phillips. As for domestic ferrets having negative impacts on native wildlife in New Mexico, I said possibly because we have no actual proof of this. In other words, we do not automatically assume such impacts occur—even though we have had reports of ferrets living ferally in New Mexico. As for the basis for our

information on feral ferrets in the state, this is in the form of reports received from various people from the late 1970's to the present time. However, we do not keep an exhaustive file on the subject, given the many other tasks to which we must attend."

On the Jurek and Ryan (1999) questionnaire, New Mexico agency personnel answered as follows:

Do you have evidence of the following?

Cases of stray individuals in urban areas: Common.

Free-living individuals documented as surviving more than a few days in wild: No.

Breeding suspected in the wild now: No or in the past: No.

Breeding individuals documented in the wild now: No or in the past: No

An established breeding population of domestic ferrets in your state: "would not likely exist"

Environmental concerns: "*Establishment of population is of concern to well-being of native species and prey bases.*"

In his response to our CSUS questionnaire, Dan Brooks (Chief, Law Enforcement Division, New Mexico Dept. of Game & Fish) estimated the total ferret population in New Mexico at 1,000 to 10,000, stated that he had no specific records of ferrets harassing wildlife, but estimated 1 to 100 instances per year; and he answered "*No/probably not*" to any instances of feral ferrets establishing breeding populations.

#### **8.4.5.1. Summary and Opinion**

Instances of stray or feral ferrets have occurred in New Mexico, but there is little evidence of the establishment of any feral breeding population. New Mexico agency personnel have previously expressed concern over the possible establishment of ferrets in their State, but this concern was not expressed concern in the CSUS questionnaire.

#### **8.4.6. Nevada Case Study**

Sue Coffey (Detective, Carson City Sheriff's Department) mentioned some instances of stray ferrets in Nevada:

"Ferret proponents will tell you that they cannot survive outside. This is absolutely untrue. They are alive and well in our counties, trash cans, parks, and woods. Unfortunately, because they smell and require a lot of attention, some owners have released their ferrets into the wild." (p. 17, Hitchcock 1995).

On the Jurek and Ryan (1999) questionnaire, agency personnel from the Nevada Division of Wildlife answered as follows:

Do you have evidence of the following?

Cases of stray individuals in urban areas: Rare.

Free-living individuals documented as surviving more than a few days in wild: No.

Breeding suspected in the wild now: No or in the past: No.

Breeding individuals documented in the wild now: No or in the past: No

An established breeding population of domestic ferrets in your state: "would not likely exist"

On the CSUS questionnaire, Nevada agency personnel estimated "*0 to 1 instances per year*" of wildlife and of livestock harassment; "*Don't know*" of abandoned or stray ferrets in the State, and "*No, or probably not*" for feral populations in the State.

#### **8.4.6.1. Summary and Opinion**

Instances of stray or feral ferrets may have occurred in Nevada, but there is no evidence of the establishment of any feral breeding population. Nevada agency personnel have previously expressed concern over the possible establishment of ferrets in their State, but this concern was not expressed concern in the CSUS questionnaire.



#### 8.4.7. San Juan Islands (Washington) Case Study

In his thesis on the mammals of the San Juan Archipelago, Schoen (1969) does not list ferret or polecat (*Mustela putorius sensu lato*) in his list of native or introduced mammals. No ferrets or polecats were caught during his extensive trapping of small mammals. Previous checklists of the mammals of the San Juan Archipelago do not list ferret or polecat (*Mustela putorius sensu lato*) (reviewed by Schoen 1969). Two native mustelids occur on the San Juan Islands: mink (*Mustela vison*) and river otter (*Lutra canadensis*); there are also historic accounts of fisher (*Martes pennanti*). The following are excerpts from Schoen (1969) that may be relevant to this case study:

“It is interesting that the red fox, Vulpes fulva, was introduced on San Juan in an attempt to reduce the rabbit population. Osburn (personal communication) stated that it was introduced as a pair in 1947 and others were brought in during the later 1940’s. It has had little effect on the rabbit population but has caused other problems. The fox is now nearing extinction on San Juan Island.” (p. 17, Schoen 1969)

“Immigration of mink to the islands was probably similar to that of the raccoon though mink are better adapted for swimming. Colonization of islands is probably more dependent on a food source than on the animal’s dispersal ability...The mink’s predominate [sic] prey on San Juan Island may be the rabbit, Oryctolagus cuniculus, though this has not been quantitatively studied...Mink have few predators other than man and possibly the great horned owl. A few mink were trapped annually on the islands.” (p. 45, Schoen 1969)

“There are three possible reasons for the fact that many mammals inhabiting the mainland are not found in the islands; 1) The mammals did not successfully cross the water barrier; 2) They crossed the barrier but their habitat requirements were not fulfilled; or 3) They crossed the barrier but their ecological niche was already filled by a similar species. According to Grant (1970) ecologically similar species have greater difficulty coexisting on islands than on the mainland.” (p. 59, Schoen 1969)

“The larger mammals Odocoileus, Lutra, Mustela vison, and Procyon are more widely distributed than Ondatra, Peromyscus, Microtus, and Sorex. Because of their ability to disperse easily, the larger mammals occupied or visited most islands of the archipelago. Whether they were resident or visitor to an island was related to that island’s habitat and food availability.” (p. 62, Schoen 1969)

In his thesis on the impact of introduced rabbits upon San Juan Island, Stevens (1975) mentions a “*feral European polecat (Mustela putorius) population on the island*” (p. 14), and lists “*European polecat (Mustela putorius)*” in Table A.2: Terrestrial mammals of San Juan Island, Washington (p. 128). Stevens (1975, p. 78) also reports that “*predators have only a superficial effect on rabbit numbers.*” Stevens (1975) discusses carnivores in his thesis, section 5.4-Qualitative Interspecific Relationships, where he mentions “*ferret*” and “*European polecat*”:

“There is little distinction between decomposers and scavengers (Odum, 1971), but for clarification, I define scavengers as those macroscopic animals feeding on dead animal matter...The most effective scavengers appear to be *Peromyscus maniculatus*, raccoon, domestic and feral cat, ferret, golden eagle, bald eagle, crow, raven, starling, and glaucous-winged gull. There is a relatively high abundance of scavengers because of the prevalence of rabbit carcasses, but I made no effort to quantify most species except bald and golden eagles... A rough estimate of scavenger numbers might be 200-400 based on observation.” (p. 110).

“There are only four known mammal predator species in American Camp: raccoon, domestic dog, domestic cat, and European polecat. The latter three are introduced....The recently discovered polecat population is probably quite low, perhaps six individuals in American Camp owing to the large territories guarded by Mustelids (Walker, 1968).” (p. 112. Stevens 1975)

A later study by the same researcher attributed the rabbit population crash on San Juan Island to a disease, possibly brucellosis, and not predation by ferrets:

“Although a significant increase in the feral ferret (*Mustela putorius*) population was observed starting in 1977 (Stevens, unpublished data, 1972-82) and the ferret is locally popularly believed responsible for the rabbit’s decline, it is doctrinally and physically inconceivable that a territorial predator can manifest a controlling influence over its prey population (Smith and Slatkin, 1973). And, whatever is affecting the population is doing so

on an island-wide basis and possibly other local islands, especially Lopez Island (1 km distant)...The results of this study have further reduced the possible causes of the decline and have further reinforced the findings of previous studies and speculations...Other than ferrets, the predator population has remained stable over the years. During this study period, only three ferrets were observed in the study area during night hours, compared with four feral cats, three dogs, four deer, one raccoon, about a dozen *Peromyscus* [sic], no hunters, one Great Horned Owl (*Bubo virginianus*), and several hundred rabbits. The only significant discovery was the disruption of the female reproductive physiology and reproductive processes. Three potential causes of this female disorder are: plant nutritional deficiency, plant estrogens, and a selective disease of the reproductive tract...In addition to the above evidence and suspicions for a brucellosis epizootic in the San Juan rabbits, a secondary piece of information has arisen...In conclusion, based on the above information, it appears that the San Juan rabbit population has suffered a decline associated with reduced reproduction over the past two years.” (p. 7-10, Stevens 1982)

The unpublished report *Status of ferrets and other introduced animals on San Juan Island* by Stevens (1979) was not available for review. To follow up on these earlier accounts, inquiries were made as to the presence of ferrets on San Juan Island. Todd Trapp (Biologist, San Juan Island National Historical Park) sent two email replies:

“Hi, Thank you for your interest in nonnative ferrets (*Mustela putorius*) on San Juan Island. I have reviewed our files and found several references to ferrets in the park. The first documented reference of ferrets at San Juan Island National Historical Park was during an MS study on the European rabbit population in our American Camp unit of the park by W. F. Stevens in 1972-74. He captured three individuals in traps. In a later letter, he references road-kill censuses on the island in which he recorded 2/year in 1977, 4/ year in 1978, and 15 to date (15 October, 1979) in 1979. In another letter from 1991 (not dated), Stevens states that the ferrets were still present on the island in May 1983 when he left the island, but that their population was declining, coinciding with a crash in the rabbit population at American Camp. In that same letter, he notes anecdotally that his "contacts" on the island state that ferrets are still around. Presumably, the ferrets were either escapes or introduced by island residents to control the rabbits. In another report I came across from 1975 referencing mammals in the islands, ferrets were only known from San Juan Island. I talked with our Superintendent, who has been here at San Juan Island National Historical Park for the last eight years, and he has heard no reports of ferrets being seen on the island or in the park during that time. You might also contact Dr. Thor Hanson, an independent biologist on San Juan Island, as he may have more information on ferrets than I. His email is: [thor@rockisland.com](mailto:thor@rockisland.com). Sorry I can not be of more help. I will be happy to send you these references if you would like. Best of luck with your research. Sincerely, - Todd Trapp.” (Todd Trapp, pers. comm., March 3, 2010).

“Dr. Graening, I will send the few references I have to you. As far as I know, there is no extant ferret population present on San Juan Island. Cheers, Todd.” (Todd Trapp, pers. comm., March 3, 2010).

Biologist Dr. Thor Hanson’s reply:

“This sounds like an interesting study. I don't have much to add to what Todd has already given you, but it's interesting that Schoen (1972) makes no mention of *Mustela putorius*. His field work was conducted in 1971-1972, and though he was trapping *Peromyscus*, his thesis gives a decent review of SJI mammals. Another lead, at least for documenting their demise, might be to talk with Shona Aitken at the Wolf Hollow Wildlife Rehabilitation Center here on the island. Every mammal species in the vicinity makes its way to them sooner or later, and she might have a date for the last ferret they treated. Best of luck, and sorry I don't have more information. – Thor.” (Thor Hanson, pers. comm. March 3, 2010).

Brian Kellogg (Washington Falconers Association) replied:

“Hi Geo, a bunch of us used ferrets on San Juan Is in the late 70's to mid 80's. A few were lost and never recovered, but to my knowledge it was very few. I think there were several gun hunters also using ferrets at that time and even before us. I never saw a feral ferret while hawking on the island in all those years and never lost one personally. I know of no documentation of lost ferrets on the islands. Sorry I can't be of more help to you... It was a long time ago. Regards, Brian.” (Brian Kellogg, pers. comm., April 6, 2010).

In the 1988 questionnaire by W. Phillips *et al.* (California Domestic Ferret Alliance), Washington State Nongame Program Manager T. Juelson responded:

“I understand that there have been attempts to use ferrets to control populations of exotic European rabbits on San Juan and Hat Islands of Puget Sound. I also understand that during the time the rabbit populations were healthy, ferrets were frequently observed in conjunction with those colonies. Those rabbit populations dramatically decreased a few years ago, and I have been unable to find anyone who has observed a ferret there since. I am convinced that the only way a European ferret can survive in the wild in Washington is in conjunction with the concentration of an exotic colonial species, such as the European rabbit.”

On the Jurek and Ryan (1999) questionnaire, agency personnel from the Washington Department of Fish and Wildlife answered as follows:

Do you have evidence of the following?

Cases of stray individuals in urban areas: Rare.

Free-living individuals documented as surviving more than a few days in wild: Yes.

Breeding suspected in the wild now: No or in the past: Yes.

Breeding individuals documented in the wild now: No or in the past: No

An established breeding population of domestic ferrets in your state: “probably does not exist”

In his response to our CSUS questionnaire, Eric Cummins (Washington Department of Fish and Wildlife) checked “*Don’t know exactly, but my professional estimate is: 1 to 10 populations*” on the questionnaire, and added the comment, “*There are escaped ferrets used in falconry in San Juan Islands, specimens in UPS Slater Museum.*”

#### **8.4.7.1. Summary and Opinion**

Ferrets were apparently introduced into the San Juan Archipelago in the mid 20<sup>th</sup> century, either by purposeful introduction to counter the impacts of introduced rabbits, or by the accidental release by hunters during ferreting, or a combination of both. There is some anecdotal evidence that a feral ferret population may have persisted for several years. The decline of feral ferrets may have coincided with the reduction in rabbit populations on San Juan Island. Currently, agency personnel and academic biologists cannot document any ferrets in the San Juan Archipelago. Currently, there is no evidence of any feral breeding population of ferrets in Washington. Agency personnel that responded to questionnaires did not express any serious concern over the possible establishment of ferrets in Washington.

#### **8.4.8. Alaska Case Study**

In 1986, the Alaska Division of Public Health reported the following:

“The Epidemiology Office has investigated five ferret bites involving six Alaskans since 1985. Four of these incidents have occurred since April 1986. In one incident, a Wasilla resident was driving home when he saw a ferret hopping across the road. He let the ferret into his car. The ferret then attacked his daughter and him, biting them both on the ankles.”

In the same bulletin, the Alaska Division of Public Health concluded:

“Many states, including California and South Carolina, restrict the importation of ferrets to protect public health and to prevent ferrets from establishing feral populations. Should ferrets escape in Alaska, they may establish feral populations that could harm Alaska’s indigenous wildlife. Possession of ferrets will lead to more injuries to children and adults and there is a possibility that rabies will be transmitted.

Public Health Warning: The Division of Public Health advises Alaskans not to purchase ferrets. Ferrets should be banned from public schools. Individuals should consider more suitable alternatives as pets for their children. Importation of ferrets to Alaska should be banned.” (Alaska Epidemiology Office 1986)

In 1987, Robert Wood (Area Management Biologist, Game Division, Ketchikan) reported the following:

“28 Dec 85 - One ferret caught in a mink set on Joe Island which is 2 miles north of the north end of the Ketchikan road system by Jason Sapp, whose father managed the Grant Island Fishing Resort.

29 Dec 85 - the same trapper caught a second ferret on Joe Island and brought it to the ADF&G office alive. I am almost positive it was a female. They quit trapping on Joe Island as soon as they realized what the ferrets were.

About late December 1985 - a ferret was killed by a car at the Ward Cove turn off and taken to the Whiskey Hollow Taxidermy in Ketchikan owned by Randy Jahnke. I have seen this hide.

There was a report of up to 10 more ferrets caught on Joe Island during the 1985-86 trapping season but I could find no one who could verify that.

Late December 1986 - a male ferret was caught in a mink / marten set on the beach in Carrol Inlet at Shoal Cove about 20 miles from Ketchikan by Mike Wood. It was a very fat healthy animal. There is a logging camp and a US Coast Guard Loran Station within 1 to 2 miles of where the ferret was caught.

The taxidermist who skinned at least 2 of the 3 ferrets from the 1985-86 season said the animals were very fat. How long any of the ferrets were in the wild on their own is unknown. I do not know of anyone trapping on Joe Island during the 1986-87 season, and the only ferret reported to me this year was the one from Carroll Inlet.” (Wood 1987a)

In a second letter and in correspondence with Ron Jurek (CDFG), biologist Robert Wood (Alaska Department of Fish and Game) speculated that that these instances of feral ferrets derived from intentional or unintentional releases by pet owners, and that the ferrets were in good condition (*i.e.*, well fed), but not necessarily breeding (Wood 1987b; Jurek Memo 1997)

On the Jurek and Ryan (1999) questionnaire, agency personnel from the Alaska Department of Fish and Game Division of Wildlife Conservation answered as follows:

Do you have evidence of the following?

Cases of stray individuals in urban areas: Sporadic.

Free-living individuals documented as surviving more than a few days in wild: Yes.

Breeding suspected in the wild now: [blank] or in the past: Yes.

Breeding individuals documented in the wild now: No or in the past: No

Environmental concerns: “Concern that a wild (feral) population could be detrimental to indigenous prey populations, displace indigenous mustelids or other animals, and introduce or spread disease. However, in most parts of the state, ferrets probably could not survive through the winter.”

Alaska Department of Natural Resources Director F. Miele responded, “*We have not collected this data*” in the Jurek and Ryan (1999) questionnaire.

Tom Schumacher (Alaska Department of Fish and Game, Division of Wildlife Conservation) responded to our CSUS questionnaire, and wrote the following in his cover letter:

“I have attached a completed survey form for the state of Alaska. Ferrets are considered pets/domestic animals similar to dogs and cats and may be possessed without a permit. I asked area management biologists throughout the state about the presence of or problems with ferrets in their areas, and received virtually no response. Alaska’s climate and healthy native predator populations likely limit the ability of ferrets to survive outside of captivity. Please contact me if you have follow-up questions.”

(Tom Schumacher, Alaska Department of Fish and Game, Division of Wildlife Conservation, email on September 25, 2009)

In his questionnaire responses, Schumacher did not have evidence of ferrets harassing or killing livestock or wildlife, but estimated 1 to 10 instances per year of ferrets harassing or killing livestock and wildlife, and did not know if abandoned or stray ferrets existed in Alaska; he checked “*No, or probably not*” on the question of breeding populations of feral ferrets existing in Alaska.



#### 8.4.8.1. *Summary and Opinion*

Instances of stray or feral ferrets have occurred in Alaska, but there is no convincing evidence of the establishment of any feral breeding population. Alaska agency personnel had historically expressed concern over the possible establishment of ferrets in their State in the 1980s, but recent communications indicate that Alaska agency personnel are not as concerned.

#### 8.4.9. **Florida Case Study**

Layne (1997) does not list the ferret (or any mustelid) as one of the nonindigenous mammals known or believed to have become established in Florida. However, Layne (1997) does document the presence of abandoned or stray ferrets in Florida, and did conclude that the ferret has the potential to become an established exotica mammal in Florida. The following pertinent excerpts are provided:

“Three major factors contribute to Florida’s vulnerability to establishment of nonindigenous mammals. The first is an abundant supply of candidate species, including a large population of exotic wildlife pets, particularly in southern Florida, and numerous tourist attractions, game ranches, and wild-animal importers and dealers. The second factor is a climatic range suitable for both temperate and tropical species. The third is a broad range of natural aquatic, wetland, and upland habitats and human-altered landscapes. To these can be added hurricanes, which may liberate and disperse captive nonindigenous wildlife as well as domestic animals.” (pp. 157-158, Layne 1997)

“Who Succeeds? Established nonindigenous mammals in Florida differ greatly in their success in expanding their ranges and populations. At one extreme is the black-tailed jackrabbit, which has failed to spread from the general area in which it was introduced some 60 years ago; at the other is the red fox, which has blanketed the state in about half that time. There are no obvious correlations between taxonomic group, geographic origin, circumstances of introduction, body size, life history traits, or other factors and the success of introduced species in Florida. Thus we are left to conclude that species have done poorly or well for different reasons.” (p. 177, Layne 1997)

“More than 50 species of free-ranging nonindigenous mammals have been recorded in Florida...A few examples will illustrate the diversity: the binturong, hedgehog, lesser anteater, baboon, chinchilla, mongoose, ferret, ocelot, African lion, Indian elephant, kinkajou, and even a marine species—the California sea lion. Most species are known from a few records of individuals recently escaped or released from captivity. In most cases, if not quickly recaptured or killed, these animals probably do not survive long in the wild. Exceptions include a jaguar shot in 1968 near Felsmere, Indian River County, that had been seen in the area over a two-year period.” (p. 158, Layne 1997)

“Given the many factors determining the chance of arrival and success or failure of an exotic species in a new environment, any attempt to predict future additions to the list [of nonindigenous mammals in Florida] must be highly speculative. Nonetheless, their popularity as pets, the known escapes or releases, and the evidence of persistence of some individuals in the wild suggest that the ferret (*Mustela putorius*) and ocelot (*Felis pardalis*) may eventually establish wild breeding populations in Florida....Ferrets were captured in Highlands Hammock State Park (Highlands County) in 1978 and Jonathan Dickinson State Park (Martin County) in 1979 (R. Roberts, pers. comm.). The latter animal may have been one that was lost by a park visitor eight months before. Other sightings of ferrets in the wild in Highlands and DeSoto counties occurred in 1973 and 1987. Of all the nonindigenous mammals that have appeared in Florida, the species most likely to become a serious pest if ever established is the mongoose (*Herpestes auropunctatus*), which has had a devastating effect on the indigenous faunas of the Caribbean islands on which it was introduced....Van Gelder (1979) has reviewed records of introductions of the species and suggests that it is less successful at becoming established in mainland habitats than on islands.” (pp. 185-186, Layne 1997).

We were not able to get any Florida agency personnel to give a written response to the questionnaire, but during phone queries, Dr. Thomas Holt, State Veterinarian, Division of Animal Industry, Florida Department of Agriculture and Consumer Services, referred us to one of his staff members—Daniel Stanke. In a phone conversation on 12 March 2010, Mr. Stanke stated that he has not had any cases of domestic ferrets (or wild ferrets) harassing or attacking wildlife,

poultry, or livestock in the entirety of his career with the Department. Note that the Fish and Wildlife Conservation Commission did not respond to our questionnaire or data requests. However, the Fish and Wildlife Conservation Commission does have a webpage pertaining to the ferret, which is copied verbatim as follows:

“Florida's Nonnative Wildlife. Species detail. Ferret - *Mustela putorius*

First year: 1970s

Extirpated year:

Established status: Species are present but not confirmed to be breeding. Population persists only with repeated introductions and/or escapes of individuals.

Estimated Florida range: 3 counties (DeSoto, Highlands, Martin). Not reported breeding

Statewide trend: Unknown status

Threats to natives: Impact on native species unknown, but can transmit rabies and is potentially an important predator.

Species Account: Releases of ferrets kept as pets account for many of the sightings of this animal. No reported breeding in the wild. Accidentally and intentionally released pets are probably present on occasion throughout the state, especially near urban areas.

References: Layne, J. 1997. Nonindigenous Mammals. Pages 157-186 in *Strangers in Paradise: impact and management of nonindigenous species in Florida* (Simberloff, D., D. Schmitz, and T. Brown, eds.). Island Press, Washington, D. C.”

(Florida Fish and Wildlife Conservation Commission 2010)

#### **8.4.9.1. Summary and Opinion**

Instances of stray or feral ferrets have occurred in Florida, but there is no evidence of the establishment of any feral breeding population.

#### **8.4.10. California Case Study**

The following references to feral ferrets were found during the literature review:

“According to information provided by DFG, there is scant evidence of feral ferret populations in California, at present. However, several years ago, a ferret kitten [sic] was found near its mother after the adult had been hit by an automobile in Kern County. It was concluded that the female had bred in the area. Since then, a male and female pair of ferrets have been live-trapped at Folsom Lake (Placer County), and another pair was trapped in Sonoma County. Sightings of individual ferrets, made by knowledgeable and reliable observers, also have been reported from Sonoma, Napa, Riverside, and San Francisco counties. In the latter instance, the ferret was emerging from a burrow at Candlestick Point Recreation Area. Animal control personnel and county public health laboratory directors in Northern California frequently report observations and captures of single ferrets. It is usually impossible to distinguish escaped or released pets from feral animals, although the former seem more likely to be observed in populated areas. Similarly, ferrets that approach people, sometimes inflicting bites as persons pet them, are likely to be stray pets. At this time, the available information suggests that if feral ferret populations exist in California, they may not yet be beyond control. It must be emphasized, though, that feral ferrets abound in other states with climates far more severe than occurs in most of California, and that California's poultry producing and game bird producing areas provide habitats especially attractive to ferrets.” (pp. 3-4, Constantine and Kizer 1988).

“From 1984 into 1986 a commercial vertebrate pest control agent in Sonoma, California, trapped two European ferrets in a creek bed near Sebastopol, saw one on California State Highway 12 and Sonoma Creek, one near the Napa River in Napa and one come up from a burrow in Candlestick Park, San Francisco (Hunt 1986). As a detection biologist with CDFA the author saw a European ferret crossing US 95 near Lost Lake north of Blythe. Reports were received without documentation of other European ferret sightings in Southern California.” (p. 211, Hitchcock 1994)

“In California, many stray ferrets are found every year. From 1989 to 1998, 47 stray ferrets from communities in the general Sacramento region of the State were transported to the Department of Fish and Game field station for



temporary holding. This represents but a small fraction of what escapes in the State as a whole. Such rescued ferrets are held until transported by volunteers to states where ferrets are legal.” (Jurek 2001)

“At least five pet ferrets have developed rabies in the United States, including an illegal escapee that was trapped in California in 1985.” (p. 18, Constantine 1986).

“Instances of Ferrets Being Illegally Used as Hunting Animals in California:

In February 1973, California Department of Food and Agriculture reported that a white ferret was found in possession of two falconers who had been stopped by a State Park Ranger at O'Neill Reservoir, Merced County. The ferret was confiscated by Department of Fish and Game.

A recent poaching case ‘resulted in the conviction of a suspect who possessed several ferrets at his residence and was using them to hunt rabbits. He was fined \$370 in Tulare County and \$1,215 in Kings County, totaling \$1,515, one day in jail, and three years probation.’ - Calif. Dep. Fish & Game, Region 4 News, February 1996.” (Jurek 2001)

“Like pet ducks, cats, and rabbits, some pet ferrets wind up in public parks. ‘It’s incredible,’ says Joe Didonato, wildlife specialist at the East Bay Regional Parks District. ‘People aren’t even supposed to have these in the state and then they go and let them out in the park. Fortunately, the last ferrets (we found) were so tame they walked right up to us.’ So far as is known, there are no ferrets loose in California now. Should any become successfully feral, they would place additional stress on the already endangered populations of the California clapper rail and other native species.” (p. 27, Gustaitis and McGrath 1992)

In 1987 in correspondence with W. Phillips, T. Burr (Director, Natural Resources Department, Marine Corps Camp Pendleton) mentioned the occasional confiscation of pet ferrets at Camp Pendleton, and that each year their animal shelter and warden personnel receive several calls regarding “black-footed ferrets”; in those cases where visual sightings can be repeated, the animal was identified as a long-tailed weasel (*M. frenata*) (California Domestic Ferret Alliance 1998, in Californians for Ferret Legalization 2000)

In a 1986 letter to the California Fish and Game Commission, Dr. Stephen Plank (Public Health Officer, Shasta County Department of Public Health) stated:

“From general knowledge of ferrets and limited personal experience with them, I urge that they continue to be out-lawed as pets in California. A few months ago, one was trapped in neighboring Tehama County. The fur on its neck showed signs of having been worn by a collar, suggesting that it was an escaped (or thrown out) pet. Not wanting to destroy the cute little creature, but knowing that it could not be kept by a private party, the trapper gave it to our Animal Control staff. Some time later, after nipping staff, a veterinarian, and his assistant, the ferret became ill and then, quite shortly, died. Because these people were trained, alert professionals, they had us examine the brain for rabies. It was strongly positive. If ferrets become legal in California, cases like the above would be repeated on a large scale, except that few of those ‘adopting’ the charming strays would have the sophistication of those exposed here. Inevitably, there would be human rabies victims. There is no commercial, social, or humanitarian benefit from allowing ferrets into California which can possibly justify subjecting the public to such an abhorrent risk.”

In the Jurek and Ryan (1999), the response given by California (Ron Jurek and Dr. Pam Swift, CDFG Wildlife Management Division) was as follows:

Cases of stray individuals in urban areas: Sporadic

Free-living individuals documented as surviving more than a few days in the wild: No

Breeding suspected in the wild now: No or in the past: No

In his response to our CSUS questionnaire, Dr. Kent Fowler (California Department of Food and Agriculture) responded “Don’t know” to instances of ferrets harassing livestock or wildlife, to stray ferrets, and to established feral populations. CDFG did not respond to our CSUS questionnaire.

#### 8.4.10.1. *Summary and Opinion*

Instances of stray or feral ferrets have occurred in California, but there is no convincing evidence of the establishment of any feral breeding population.

## 8.5. SUMMARY OF AGENCY QUESTIONNAIRE RESPONSES

### 8.5.1. Summary of the California Domestic Ferret Alliance Questionnaire

In 1988, W. Phillips *et al.* (California Domestic Ferret Alliance) distributed their results of their *50 State Survey On the Supposed Existence of Feral Populations of Domestic Ferrets In Each State* (reprinted in: Californians for Ferret Legalization 2000), and stated this conclusion:

“In response to their purported concerns about feral populations, we did a survey of all 50 state Departments of Fish and Game and asked each for evidence of any feral populations of domestic ferrets. In every case (including California), the answer was ‘no evidence.’ By comparison, the same question concerning cats or dogs would yield much different results.” (Carley 1994)

Jurek (2001) disputed the findings in that survey that State agencies provided no evidence of feral ferrets in their states. In interpreting the response letters and correspondence between W. Phillips and state agencies, we also disagree with the conclusion. Some State agencies reported data deficiencies, which is not exactly the same as “no evidence”; other State agencies report feral individuals in their States, and expressed concern over the possibility of these individuals establishing breeding populations. Some excerpts are reproduced verbatim here:

- Alaska Department of Natural Resources Director F. Miele responded, “*We have not collected this data*”
- Georgia Department of Natural Resources Senior Wildlife Biologist J. Scharnagel responded, “*While there have been a number of documented instances of ferrets escaping and being released into the wild in this state, it has not yet been documented that the animal has established feral populations.*”
- Idaho Fish and Game Bureau of Wildlife staff Craig Groves responded, “*There are no statutes concerning this species in Idaho and to the best of our knowledge there are no known feral ferret populations. However, there are undoubtedly some domestic ferret individuals which escape captivity and become feral.*”
- Iowa Department of Natural Resources Furbearer Specialist R. Andrews responded, “*We are not aware of any feral colonies of domestic ferrets in Iowa. Occasionally we do get reports of single animals being sighted around the state. We believe most of these are escapees from careless owners. We are not doing any research on the critters. Our contention concurs with you in that we do not believe they can survive in the wild.*”
- Louisiana Department of Wildlife and Fisheries staff J. Angello responded, “*There are no known feral populations of domestic ferrets in Louisiana. There are certainly escaped individuals, because we occasionally get nuisance complaints about them in metropolitan areas.*”
- Maryland Department of Natural Resources Director D. MacLauchlan responded, “*While we know of instances where individual ferrets have escaped from captivity, we know of no feral, viable population which has become established here. We cannot, however, ensure that this has not happened.*”
- Missouri Department of Conservation Assistant Wildlife Division Chief did not answer the question about whether or not a feral ferret population existed in Missouri, but simply stated that ferrets were considered domestic animals and not regulated by his Department.
- Montana Department of Fish, Wildlife, and Parks Nongame Coordinator D. Flath responded, “*The domestic ferret occurs in the wild in Montana only to a limited extent. Reports over the years generally suggest that released animals do not over-winter successfully. Thus a ‘population’ does not exist. Domestic ferrets in the wild occur only as current year feral animals.*”
- Nebraska Game and Parks Commission Nongame Wildlife Biologist F. Andelt responded, “*We have had a few domestic ferrets found in the wild in the past but we do not believe that any self-sustaining population exists.*”

- New Hampshire Fish and Game Department Chief H. Howell responded, “*We occasionally have ferrets trapped or road-killed in New Hampshire.*”
- North Dakota Game and Fish Department Natural Resource Zoologist R. Krell responded, “*There are no known feral populations of domestic ferrets in North Dakota. However, occasionally there are domestic ferrets that escape their owners. These animals are of concern to our Department as they pose a threat to ground nesting birds and mammals. In addition, domestic ferrets loose in the wild are considered to be of concern from the standpoint of rabies transmission.*”
- Oregon Department of Fish and Wildlife Staff Biologist J. Thiebes responded, “*Oregon has no known feral populations. Our field biologists do pick up an occasional ferret and are concerned about any potential population becoming established.*”
- South Dakota Department of Game, Fish and Parks Assistant Director G. Vandel responded, “*I have heard reports of domestic ferrets being released into the wild after outliving their use as pets but survival in the wild has never been documented.*”
- Texas agency personnel did not answer the question about whether or not a feral ferret population existed in their state.
- Utah Wildlife Resources Division Mammals Program Coordinator K. Elowe responded, “*Although we have a few cases where people have live-trapped M. furo (usually in close proximity to residences), we do not know of any feral populations of domestic ferrets.*”
- Washington State Nongame Program Manager T. Juelson responded, “*I understand that there have been attempts to use ferrets to control populations of exotic European rabbits on San Juan and Hat Islands of Puget Sound. I also understand that during the time the rabbit populations were healthy, ferrets were frequently observed in conjunction with those colonies. Those rabbit populations dramatically decreased a few years ago, and I have been unable to find anyone who has observed a ferret there since. I am convinced that the only way a European ferret can survive in the wild in Washington is in conjunction with the concentration of an exotic colonial species, such as the European rabbit.*”

### 8.5.2. Summary of the Jurek and Ryan (1999) Questionnaire

The following questionnaire results are copied verbatim from Jurek and Ryan (1999):

“Stray Ferrets in Urban Areas. Most states reported having knowledge of stray ferrets in urban areas. Fifteen states (30%) reported ‘None’, 28 states (57%) reported them to be ‘rare’ or ‘sporadic’, and New Mexico and Georgia (4%) reported them to be ‘Common’ and ‘Frequent’, respectively. Five states (10%) reported ‘Unknown’ or gave no response.” (p. 10, Jurek and Ryan 1999)

“Ferrets Surviving in the Wild. Five States (10%) (Alaska, Connecticut, Massachusetts, Washington and Wyoming) reported free-living individual ferrets documented as having survived more than a few days in the wild. Three states (Kansas, Montana and Rhode Island) (6%) reported ‘Unknown’. The other states reported having no such documentation.” (p. 10, Jurek and Ryan 1999)

Ferrets Breeding in the Wild. No state reported suspected breeding or documented breeding by ferrets in the wild now (1996/97). Three states (6%) (Alaska, New Mexico, and Washington) reported suspected breeding by ferrets in the wild in the past. No state reported documented breeding by ferrets in the past.” (p. 10, Jurek and Ryan 1999)

“Knowledge of Breeding Populations. Asked about the potential for having established breeding populations of ferrets in the state, no state wildlife agency marked these possibilities: ‘definitely exists,’ ‘probably exists,’ ‘definitely existed but definitely no longer exists’, or ‘definitely existed but current status is unknown.’ States could mark more than one category. Ten states (20%) replied that an established breeding population ‘definitely does not exist’, 27 (54%) replied that one ‘probably does not exist’, and five (10%) replied that one ‘would not likely exist’. Seven states (14%) replied that such a population ‘cannot be determined without a special survey’. Three (6%) states (Indiana, Kansas and Texas) replied ‘Unknown’. No state wildlife agency marked the option that an established breeding population ‘would not be a serious concern’.” (p. 10, Jurek and Ryan 1999)

“Effort to Assess the Status of Ferrets in the Wild. Asked about the amount of effort the state wildlife agencies have made to assess the status of ferrets in the wild, 43 states (86%) reported ‘None’. Respondents in 34 of the states reported that it was ‘not considered to be important’, and six of the states reported that such assessment would be ‘desirable but not feasible’.” (p. 11, Jurek and Ryan 1999)

“Method of Assessing Status of Ferrets in the Wild. Seventeen states indicated what method is used to assess status of ferrets in the wild. Of the seven states that reported having made some level of effort, six checked ‘opportunistically document’, one marked ‘thoroughly check out all reports’, one checked ‘special sampling’, and two checked ‘concerted surveys.’ Ten states that did not report making some level of effort to assess status of ferrets in the wild indicated that they ‘opportunistically document.’ No state agency responded that they ‘routinely check during area studies’.” (p. 11, Jurek and Ryan 1999)

“Agency Action Upon Discovery of Established Breeding Population. Each state marked one or more of the following responses about how breeding populations of ferrets would be handled:

| Action                                      | Percent | Number (of 50) |
|---------------------------------------------|---------|----------------|
| Attempt eradication                         | 58%     | 29             |
| Local area management decision              | 18      | 9              |
| No action would be taken                    | 4       | 2              |
| Other:                                      |         |                |
| Capture and turn over to ferret groups      | 2       | 1              |
| Unknown/undecided/determine extent then act | 24      | 12             |

(p. 12, Jurek and Ryan 1999)

### 8.5.3. Summary of the CSUS Questionnaire

The following tables summarize CSUS questionnaire results pertaining to stray ferrets, breeding populations, and wildlife impacts.

| Are there instances of domesticated ferrets killing or harassing wildlife in your State? |                                                                                                                            |                                                                                                          |         |           |              |                    |              |                |
|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------|-----------|--------------|--------------------|--------------|----------------|
|                                                                                          | Don't Know                                                                                                                 | No                                                                                                       | 1 to 10 | 10 to 100 | 100 to 1,000 | est. 0-1/yr        | est. 1-10/yr | est. 10-100/yr |
| Response of States & Provinces                                                           | AR(2), AZ(2), CA, CO, CT(2), DC, DE, HI, ID, KY(2), MD, ME, MI, MN, MO, NB, NC, ND, NJ, NY, OH, PA, SC, SD, TN, WA, WA, WI | AL, GA, IA(2), IL(2), IN, KS, MA, MN, MS, MT, NH, NJ, NS, NY, OK, OR, RI, SD, TX, UT, VI, VT, WA, WV, WY | blank   | blank     | blank        | LA, NE, NV, WI, WY | AK, OK       | NM             |

| Are there abandoned, stray, or otherwise unconfined domesticated ferrets in your State? |                                |                                                                                                                                                                              |        |                                    |                 |
|-----------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------|-----------------|
|                                                                                         | No                             | Don't Know                                                                                                                                                                   | Yes    | Est. 1 to 10                       | Est. 10 to 100  |
| Response of States & Provinces                                                          | HI, MA, NH, NJ, OR, SD, UT, WV | AK, AL, AR, AZ, BC, CA, CO, CT(2), DE(2), GA, IA, ID, IL(2), IN, KS, KY(2), LA, MD, ME, MN(2), MO, MT, NB, NC, NE, NJ, NM, NV, NY(2), OH, OK, PA, RI, SC, SD, TN, VT, WA, WY | WA(2)* | DC, IA, MI, ND, OK, VI, WA, WI, WY | AZ, NS, SD*, WI |
| * These responses were researched further and discussed later.                          |                                |                                                                                                                                                                              |        |                                    |                 |



| Have any unconfined domesticated ferrets established a (feral) breeding population in your State? |                                                                                                                                                                                            |                                                                      |         |           |              |              |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------|-----------|--------------|--------------|
|                                                                                                   | No, or probably not                                                                                                                                                                        | Don't know                                                           | 1 to 10 | 10 to 100 | 100 to 1,000 | Est. 1 to 10 |
| Response of States & Provinces                                                                    | AK, AL, AZ, BC, CO, DE, DE, GA, HI, IA, IL, IN, KS, KY(2), MA, ME, MI, MN(2), MO, MT, NB, ND, NE, NH, NJ, NM, NS, NV, NY(2), OH, OK(2), PA, RI, SC, SD(2), VI, VT, WA(2), WI(2), WV, WY(2) | AR(2), AZ, BC, CA, CT(2), DC, IA, ID, IL, LA, MD, MN, NC, NJ, OR, TN |         |           |              | SD*, WA*     |

Hawai'i (K. Minami, Dept. of Agriculture) reported no escaped or wild ferrets, and no breeding populations.

Answering differently than the other agency respondent from South Dakota, Eileen Dowd Stukel (Wildlife Diversity Coordinator, South Dakota Dept. of Game, Fish, and Parks) checked “*Don't know exactly, but my professional estimate is: 1 to 10 populations*” on the questionnaire, but she provided no explanation for this estimate. In a follow up phone conversation in March 2010, Dr. Graening inquired as to the specifics of this answer. Ms. Stukel stated that she had heard such information from a colleague—Dr. Kent Jensen (Department of Wildlife and Fisheries Science, South Dakota State University). In April 2010, Dr. Graening spoke to Dr. Jensen about this reference. Dr. Jensen knew of no cases of ferrets escaping or establishing breeding populations in South Dakota.

In the CSUS questionnaire, most State agencies indicated that censusing stray or feral ferrets was not important:

Has your State made any effort to assess the status of domesticated ferrets in the wild/feral/outside of captivity?

‘No, not considered to be important’ = AK, AL, AR, AZ, BC(2), CO, CT, DC, DE, GA, IA(2), ID, IL, IN, KS, KY(2), LA, MA, ME, MI, MN(3), MO, MT, NB, NC, ND, NE, NH, NJ(2), NM, NS, NV, NY(2), OH, OK(2), OR, PA, RI, SC, SD, VI, VT, WA(3), WI(2), WV, WY(2),

‘No, but desirable’ = MD, MS

‘Yes’ = HI, TN

Thus, 41 States and 2 Provinces responded that it was not considered important to assess the status of domesticated ferrets in the wild/feral/outside of captivity.

In the CSUS questionnaire, several State agencies indicated that no action would be taken upon discovery of stray or feral ferrets:

What action would be taken by your agency upon discovery of an abandoned, escaped, feral, or otherwise unconfined domesticated ferret?

‘No action would be taken’ = AZ, AR, BC(2), DE, IA, IL, KY, MN(2), NY(2), OR, VT, WA, WV, WY

‘Defer to local government management decision’, ‘Live trap and take to animal shelter (presumed lost pet)’, ‘Live trap and euthanize’, ‘Take by any means’, or ‘Other action’ = AK, AL, AR, CA, CO, CT, CT, DC, DE, GA, HI, IA, ID, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MT, NB, NC, ND, NE, NH, NJ(2), NM, NS, NV, OH, OK(2), PA, RI, SC, SD, TN, TX, VI, WA(3), WI(2), WV, WY

What action would be taken by your agency upon discovery of an established (feral) breeding population of domesticated ferrets?

‘No action would be taken’ = AR, BC, IA, KS, KY(2), MD, NJ, OR, VT, WA, WI

‘Defer to local government management decision’, ‘Live trap and take to animal shelter (presumed lost pet)’, ‘Live trap and euthanize’, ‘Take by any means’, or ‘Other action’ = AK, AL, AR, AZ, CA, CO, CT(2), DC, DE(2), GA, HI, IA, ID, IL, IN, LA, MA, ME, MI, MN(3), MO, MT, NB, NC, ND, NE, NH, NJ, NM, NS, NV, NY(2), OH, OK(2), PA, RI, SC, SD, TN, TX, VI, WA(2), WI, WV, WY(2)

Furthermore, many states do not even regulate the release of ferrets into the wild:

Do you have state regulations that clearly prohibit the release of domesticated ferrets from captivity?

‘Yes’ = AK, AR, BC, CA, CT, GA, HI, IA, ID, IL, KY(2), MA, MI, MO, MT, NB, ND, NE, NJ, NS, NV, PA, RI, TN, VI,

‘No’ = AL, AZ, CO, DC, DE, IA, IN, KS, LA, MD, MN(3), NC, NH, NJ, NM, NY(2), OH, OK(2), OR, SC, SD, VT, WA(3), WI(2), WV, WY(2)

Thus, 22 States have no regulations against release of ferrets from captivity. California Fish and Game Code (14 CCR § 671.6) prohibits the release of captive wild animals.

#### 8.5.4. Summary and Opinion

Surveys of State agencies reveal a large data deficiency in the enumeration of stray mustelids, or non-native wildlife in general, in the USA. In our CSUS questionnaire, the majority of State agency personnel responded “*Don’t know*” when asked about ferrets impacting wildlife or the existence of stray or feral ferrets in their States. A large majority of State agency personnel responded that there were not, or probably were not, any established feral ferret breeding populations in their States. More surprisingly, 41 States and 2 Provinces responded that it was not considered important to assess the status of domesticated ferrets in the wild, and 22 States have no regulations against release of ferrets from captivity into the wild. Only California and Hawai’i agency personnel gave strong objections to the importation or possession of ferrets.

### 8.6. POTENTIAL MITIGATION MEASURES

The establishment of a feral breeding population of ferrets in California is a potentially significant impact upon wildlife, especially as an incremental contribution to the cumulative impacts upon wildlife from statewide factors such as habitat loss and degradation, invasive species, and even climate change. Discussed next are potential mitigation measures.

For CDFG to support a legalization action, CDFG is likely to require the following stipulations in such an action:

- Importation of only sterilized ferrets
- No importation or possession of polecat-ferret hybrids or polecats
- No breeding of ferrets, hybrids, or polecats in California
- Prohibition of ferrets on all of California’s islands, which are sensitive to exotic mammal introductions
- Prohibition of release of ferrets into the wild

Mandatory sterilization of ferrets is common in the pet industry. Marshall Pet Products, Inc., the largest ferret breeding operation in USA, prepares each pet ferret for sale by first neutering or spaying the ferret, vaccinating the ferret, then tattooing the ear with 2 dots to indicate that the ferret was spayed/neutered and vaccinated, and finally, a “...*secret tattoo to identify the surgeon who does the spay or neuter.*” (Paul Juszczak, Marshall Pet Products, Inc., pers. comm., March 31, 2010). Sterilization is recommended by veterinarians to avoid endocrine diseases and reduce musky odors (e.g., Williams 1984).

An extensive network of shelters and communication systems could be established to handle unwanted or abandoned ferrets. A public outreach / education program could be implemented to disseminate information about the disposition, needs, and proper care of ferrets.



A licensing program and compliance program could be established. Punitive measures could be established to discourage the importation of fertile ferrets, hybrids, or polecats, or the establishment of breeding facilities. The compliance program may need to include scientific training to identify different species of mustelids, especially those specimens within the polecat-ferret spectrum. Phillips and Shimbo (1990) give instances of CDFG game wardens mistaking native weasels for ferrets.

A program for elimination or control of an established feral ferret population could be established. Clapperton (2001) discussed control measures, including trapping, poison bait, biological control agents such as canine distemper, habitat modification, and non-lethal methods. USGS (2008) also discussed control measures.

## **8.7. SUMMARY AND OPINION**

The literature indicates that ferrets can and do escape confinement, and that accidental or intentional releases of ferrets into the environment do occur. It does not appear to be possible to completely eliminate the risk of a ferret escaping confinement in California. Ferrets have some, but not all, of the life history traits of an ideal invader species. The case studies of feral ferrets in New Zealand and other parts of the World demonstrate that mustelids within the polecat-ferret spectrum (*M. putorius sensu lato*) can establish breeding populations and adversely impact wildlife. It is not clear whether the American domesticated pet ferret can be directly compared to these feral populations, and whether they can be assigned the same risk of establishment and adverse impact upon the environment. All of the ideal conditions for establishment of a feral ferret population have not yet been met in California: a moderate climate, a superabundance of preferred prey, a community devoid of competitors and predators, and repeated introductions of large founding populations. The literature is divided on the topic of whether domesticated ferrets can revert to a feral condition and survive in the wild. Predation and competition from California's wildlife may be important factors that limit the success of the establishment of a feral ferret population.

Surveys of State agencies reveal a data deficiency in the enumeration of stray mustelids in the USA. A large majority of State agency personnel responded that there were not, or probably were not, any established feral ferret breeding populations in their States, and most State agencies responded that it was not considered important to assess the status of domesticated ferrets in the wild. Only California and Hawai'i agency personnel gave strong objections to the importation and possession of ferrets.

Obviously, sterilized ferrets have no potential to establish breeding populations. Popular pet manuals indicate that the breeding of ferrets, and the ownership of hybrids, are desired by a portion of the pro-ferret community. With or without regulations, the State of California cannot completely prevent the importation of fertile ferrets, polecat-ferret hybrids, or polecats. Thus, some risk of fertile ferrets, hybrids, or polecats establishing feral breeding populations in California still remains; no author or scientist has been able to convincingly enumerate that risk. Any ferret legalization actions may need to assure CDFG that there is no possibility that hybrids or polecats are imported into California, or demonstrate that hybrids and polecats do not pose a threat to the environment if they are released into the wild.

The potentially significant impact upon wildlife of the establishment of a feral breeding population of ferrets may need to be analyzed further in the EIR.

## **9. ANALYSIS OF POTENTIAL AGRICULTURE ISSUES**

### **9.1. PREDATION / AGGRESSION TOWARDS LIVESTOCK**

#### **9.1.1. Reports from the Literature**

Smallwood and Salmon (1992) provided a review of the literature on the impact of exotic species upon agricultural resources. The polecat's impact on caged poultry is well documented in the literature (e.g. Roots 1976). Some excerpts are provided here:

“Their usual place of retirement is in woods or coppices situated at no great distance from farms; from whence they issue about the dusk of evening, or later, to prey upon any living thing, of manageable size, which may come

within their reach...Indeed, says Mr. Wood, 'it is a curious fact, that this animal generally kills all the poultry in the apartment it plunders, be they never so many.' But if the Polecat be so formidable an enemy to the farmyard, it is not less so to the game-preserve and the warren. The destruction which it occasions amongst the eggs and young of Pheasants and Partridges, young Hares, and Rabbits, is incalculable..." (pp. 157-158, Bell 1837)

"The Polecat has always been regarded as bloodthirsty vermin (Beddard, 1909), with the reputation of a wanton killer of poultry and other stock, and it is still trapped as such by many estates...As with most carnivores, the number of prey killed by a Polecat is not directly related to the animal's appetite. Perhaps because the hunger threshold below which most aspects of hunting behaviour are suppressed is different from, and commonly much greater than, that which suppresses killing, the sated carnivore cannot help itself continuing to make easy kills. Therefore, if a Polecat gains access to a poultry house or pheasant pen it may slay all the occupants. Often only the brains of the victims are eaten in such a situation." (p. 178, Blandford 1987).

"Henroosts and rabbit hutches are often preyed upon, with results that are quite disastrous, when the size of the animal is considered. It often goes into the holes of the Rodents, and drives out the whole family." (p. 385, Bachrach 1930)

"Feral ferrets are well known to behave like their polecat progenitors (Corbet, 1980), so it is not surprising that they have proved to be exceedingly destructive to small livestock like poultry and rabbits, as well as to native vertebrates. Their sometimes wanton destruction of small animals far beyond their food need wreaks havoc on victimized native populations. Not only may adult animals be killed, but native species populations may be further harmed by the ferret's particular appetite for and ability to reach nestling mammals, birds, and eggs of the latter (ground-nesting species in particular)." (p. 34, Constantine and Kizer 1988)

Published incidences involving ferrets are fewer, and often lack detail:

"Escaped European ferrets have established self-sustaining feral populations, and their attacks on commercial poultry have prompted some states and municipalities to prohibit the sale or ownership of these adaptable predators. Pet ferrets are illegal in California, Massachusetts, South Carolina, Georgia, New Hampshire, New York City, and Washington D.C." (p. 222, Nagami 2004)

"Domestic species such as poultry may also be at risk, especially given the ferret's tendency to 'surplus kill' when presented with large numbers of prey." (p. 9, Markula *et al.* 2009)

"Ferrets were developed by man from polecats, which have a reputation for being extremely bloodthirsty, killing far more than they can devour and indiscriminately attacking any and all animals within range (Johnston, 1903). In addition to killing native animals, polecats also have been reported to ravage small livestock, such as rabbits and poultry. Larger animals may also be attacked...Feral ferrets behave as polecats (Corbet and Ovenden, 1980), and have been known to engage in wholesale slaughtering of livestock (Everitt, 1897; Dolensek and Burn, 1976; Harding, 1915). The savage characteristics of polecats were highly valued and emphasized in man's selective breeding and development of ferrets for killing rats and rabbits..." (p. 15, Constantine and Kizer 1988)

"Ferrets must be kept away from poultry." (Lewington 1988, p.1)

### **9.1.2. Reports from Agencies**

In 1989, W. Phillips *et al.* (California Domestic Ferret Alliance) distributed their results of their questionnaire *50 State Survey On the Effects of Domestic Ferrets On Agricultural Interests In Each State* (reprinted in: Californians for Ferret Legalization 2000). The majority of responses from state agricultural agencies indicated that they did not believe that ferrets were adversely affecting their agricultural industries. However, the following excerpts of responses demonstrate that some agencies were concerned about impacts from ferrets, while others could not make a decision because of data deficiencies:

- California Department of Food and Agriculture Director Henry Voss responded, “*All available information to date indicates that a feral population of ferrets does not occur in California. We have not received any reports of damage to agriculture by ferrets*”
- Delaware Department of Agriculture Executive Assistant M. Owens responded, “*Dr. Towers [State Veterinarian] has also informed me that we have not received many reports of escapes of these animals, however, if they were to become feral they might cause some concern to agricultural interests.*”
- Georgia Department of Agriculture staff member T. Irwin responded, “*We are not aware of any impact this species has had on agriculture in Georgia. This is, however, inconclusive since we are actually not aware of any work that has been done to measure the population or evaluate the impact of this species on agriculture in Georgia.*”
- Illinois Department of Agriculture Assistant to the Director J. Kunkle responded, “*The Illinois Department of Agriculture does not have any data regarding damage to agriculture attributed to Domestic Ferrets.*”
- Indiana Deputy Director of Agriculture did not answer the question.
- Kentucky Department of Agriculture personnel responded that they had no information on the subject.
- Louisiana Department of Agriculture personnel responded that they had no information on the subject. Louisiana Department of Wildlife and Fisheries District Game Biologist R. Love responded, “*I am not aware of any data concerning the effect of domestic ferrets on agriculture in Louisiana. However, the absence of data does not mean there would be no effect, nor would agriculture be our only concern. We have had 3 ferrets captured in the wild and brought to our offices over the past few years that we know about. Fur trapping is a big industry in Louisiana. Approximately 1/3 of the furs exported from the United States annually comes from Louisiana. We are concerned about anything that could interfere with that. We are aware of what happened to other transplant species (e.g. the mongoose in Hawaii and the nutria in Louisiana). Specifically we would be concerned about the ferret’s potential of occupying the same niche as the mink or weasel in Louisiana.*”
- Michigan Department of Agriculture personnel did not answer the question.
- Missouri Department of Agriculture personnel responded that they had no information on the subject.
- New Mexico Department of Agriculture personnel responded that they had no information on the subject.
- Oregon Department of Agriculture personnel responded that they had no information on the subject.
- Texas Parks and Wildlife Department Nongame Biologist C. Martin responded, “*Observations of ferrets in the wild have been reported in Texas, but I am not aware of any documented reproduction. Several of these animals are released or escape each year in Texas, so the potential for reproduction does exist, particularly in the neotropical region in south Texas. While the impact of released and escaped ferrets has not been documented, regardless of reproductive success, there is a potential for negative impacts on wildlife, particularly ground-nesting birds.*”
- Virginia Department of Agriculture personnel responded that they had no information on the subject.
- Wisconsin Department of Agriculture personnel responded that they had no information on the subject.
- Wyoming Department of Agriculture personnel responded that they had no information on the subject.

W. Phillips and Assemblyman Jan Goldsmith solicited opinions of agricultural organizations in California regarding the potential impacts of ferrets upon agricultural interests, particularly as it applied to the bill AB2497 (reprinted in Californians for Ferret Legalization 2000), and some results are as follows:

- California Poultry Industry Federation responded in 1994 that ferrets will not hurt the poultry industry
- Pacific Egg & Poultry Association responded in 1994 that “*...there is little concern*”.

In 2003, the California Waterfowl Association wrote to Assemblyman Canciamilla, regarding Bill SB89, that:

“The California Waterfowl Association (CWA) must strongly oppose SB89...until full environmental review shows that they do not pose and environmental threat to our State’s native fauna. Our Association continues to strongly believe that legal ownership of ferrets in California will result in the establishment of healthy feral populations of this exotic, predatory species causing significant negative environmental impacts on our native fauna, particularly waterfowl and ground-nesting birds.”

In 1994, the California Farm Bureau wrote to the California State Assembly that they opposed Assembly Bill 2497, stating:

“We believe the temperate climate and diversity of our natural and agricultural environments could result in serious unintended consequences to our wildlife and some domestic animals. Some poultry producers, for example, could experience severe flock depredation. Moreover, threatened or endangered birds and small mammals could also fall victim to the ferret...We should demand California-based research which will answer these concerns...Farmers and ranchers have experienced serious feral cat and dog problems. We find the prospect of a new potential pest unsavory.”

In 1985, Clare Berryhill (Director, California Department of Food and Agriculture, wrote to the California Fish and Game Commission to explain the Departments policy on opposing any permit requests for the importation or possession of ferrets, stating:

“Some of the reasons for our policy to remain unchanged are: 1) With our system of exclusion and detection, we feel we can maintain a state free of feral populations of ferrets that may establish if ferrets were allowed to enter the state. 2) If feral populations did establish, we have very few tools to eradicate such a population. 3) Upon establishment of a feral population, there undoubtedly would be an undesirable impact on poultry production, both commercial and backyard, within the state....5) There is also concern from the Animal Damage Control sector on increased costs if feral populations were to occur...”

The results of the CSUS questionnaires section on impacts to livestock are presented in the following table.

| Are there instances of domesticated ferrets killing or otherwise harassing livestock in your State? |                                                                                                            |                                                                                                                                 |         |           |              |                    |              |                |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------|-----------|--------------|--------------------|--------------|----------------|
|                                                                                                     | Don't Know                                                                                                 | No                                                                                                                              | 1 to 10 | 10 to 100 | 100 to 1,000 | est. 0-1/yr        | est. 1-10/yr | est. 10-100/yr |
| Response of States & Provinces                                                                      | AR(2), AZ(2), BC(2), CA, DE, ID, KY, MD, ME, MI, MN, MO, NB, NC, NJ, NM, NY, OH, PA, SC, SD, TN, WA(3), WI | AL, CO, CT(2), DE, GA, HI, IA(2), IL(2), IN, KS, KY, MA, MN, MS, MT, ND, NH, NJ, NS, NY, OK, OR, RI, TX, UT, VI, VT, WA, WV, WY | blank   | blank     | blank        | DC, LA, NE, NV, WI | AK, OK, WY   | blank          |

Thus, our CSUS questionnaire produced no documented cases of ferrets killing or harassing livestock, although almost half of the 50 States reported a data deficiency. Eight States gave undocumented estimates of negative interactions with livestock in the range of 0 to 10 instances per year. No responding State agricultural department, including California's, indicated any serious concern about ferrets impacting agricultural resources in their State.

## 9.2. OTHER AGRICULTURAL ISSUES

Escaped, stray, or feral ferrets have the potential to vector diseases to livestock. In particular, ferrets may serve as a reservoir, or vector, of *Mycobacterium bovis*, the bacterium which causes tuberculosis in cattle:

“After the Australian brushtail possum *Trichosurus vulpecula* Kerr, ferrets are regarded as the species most likely to threaten New Zealand's international beef, dairy and venison industries because they carry bovine tuberculosis (TB) and transmit the disease to livestock.” (pp. 67-68, Byrom 2002)

“Bovine tuberculosis is one of the more important animal health problems in New Zealand....The failure to eradicate bovine tuberculosis is due to the continual spread of *Mycobacterium bovis* from wildlife to cattle and farmed deer. Although the Australian brushtail possum *Trichosurus vulpecula* is the most important wildlife reservoir of infection in New Zealand, *M. bovis* has also been isolated from wild deer, feral pigs, feral goats, feral cats and feral cattle. In this letter we wish to report the finding of *M. bovis*-infected wild ferrets (*Mustela putorius furo*) in seven geographically distinct areas of New Zealand (Figure 1). While there are reports from overseas of *M. bovis* being isolated from domesticated ferrets, there are no reports of its isolation from wild ferrets or polecats (*Mustela putorius*)....These observations indicate that like the possum, ferrets are very susceptible to infection



with *M. bovis*...Current investigations in the macKenzie Basin and elsewhere are trying to determine whether tuberculous ferrets are a source of infection for domestic livestock. Even if there is no spread of infection to other hosts, ferrets may be a readily accessible indicator species to examine when looking for wildlife reservoirs of *M. bovis* in New Zealand.” (pp. 148-149, deLisle *et al.* 1993)

“Ferrets pose a threat to New Zealand’s agricultural industry, since our trading partners demand that we take steps to control potential transmitters of Tb to cattle and deer...However, as cattle and deer show little exploratory behaviour towards ferrets, it is unlikely that direct transmission from ferrets is a major source of Tb-infection of livestock.” (p. 195, Clapperton 2001).

Some authors consider the ferret to be a threat to agricultural interests:

“It can be seen that European ferrets are established in climates much more severe than most of California with the exception of some dessert and high mountain areas. California's poultry and game bird producing areas could be readily colonized by the European ferret. As Eldridge Hunt (1986) states: ‘We don't need 210 years of bounty system like Great Britain to drain government dollars to try to control ferrets. We need to prevent their establishment.’ ” (p. 211, Hitchcock 1994)

Clapperton (2001) states that one of the reason feral ferret populations are controlled in New Zealand is for “...duckshooters and poultry keepers keen to protect their local duck populations or hens.” (p. 196, Clapperton 2001).

Clapperton (2001) discusses potential beneficial impacts of feral ferrets upon wildlife and agricultural interest; the exact wording is as follows:

“Benefits. While ferrets may not be keeping rabbits in check in the semi-arid tussock lands of Central Ontago, they do have some effect on rabbits elsewhere. Predation by ferrets is a major cause of mortality of juvenile rabbits on improved pasture in North Canterbury (Robson 1993). Pierce (1987) concluded that predators (ferrets, cats and harriers) exerted a high predation pressure on the surviving rabbits for up to six months after poisoning had reduce d the rabbit population along the Tekapo River. In that habitat they may play another useful role, outcompeting stoats, and thus reducing predation by stoats on riverbirds (Pierce 1987), but this has not been verified.” (p. 194, Clapperton 2001).

Similar to cats, ferrets may be effective in controlling rats and other pest populations in urban or suburban environments.

### 9.3. SUMMARY AND OPINION

The literature documents that ferrets may have impacted European poultry production, especially in the late 19<sup>th</sup> and early 20<sup>th</sup> century. The literature is largely devoid of any instances of ferrets impacting agricultural resources in the USA. USA has, for the most part, phased out household poultry and egg production and now relies almost exclusively on commercial facilities (confined animal feeding operations); these facilities may be better protected from predators than traditional domestic hen houses and coops. Questionnaires of agricultural departments in the USA has not revealed any major opposition to ferrets; where agricultural agency personnel have responded negatively to ferret legalization, their concerns focused on the risk of ferrets biting humans or on the risk of ferrets establishing feral breeding populations, and not on the impact of agricultural resources. This issue may not need to be analyzed further in the EIR.

## 10. ANALYSIS OF POTENTIAL HUMAN HEALTH AND SAFETY ISSUES

### 10.1.RABIES (*LYSSAVIRUS*) TRANSMISSION

#### 10.1.3. Reports from the Literature

The medical community, via its publications, has changed its stance on rabies issues pertaining to ferrets over the last four decades, beginning in the 1970s and 1980s with emphatic statements that ferrets are not appropriate pets because of their proclivity to bite and the absence of effective vaccines, to cautionary statements that ferrets may be suitable pets in the 1990s, to neutral statements in the 2000s that ferrets should receive rabies vaccinations like other household pets.

Up to 1988, there was no rabies vaccination that was proven effective for ferrets and no standard quarantine procedures due to a lack of data on the pathogenesis of rabies in ferrets (Paisley and Lauer 1988). Because of this, Paisley and Lauer (1988) recommended that “...killing the ferret and examining the brain for rabies virus antigen is recommended after any human ferret bite.” Paisley and Lauer (1988) also recommended, “Until an effective rabies vaccine is available and more data regarding ferret bites are collected, we believe that health professionals should support legislation restricting the sale of pet ferrets.” Constantine and Kizer (1988) published a similar opinion. As late as 1995, data on the pathogenesis of rabies in ferrets was still lacking. Hitchcock (1994) admitted that an effective rabies vaccine exists for ferrets, but recommended euthanasia and immediate brain dissection because of uncertainty in rabies pathogenesis in ferrets. The National Association of State Public Health Veterinarians apparently issued an advisory *Statement on Ferrets* that expressed its concerns about the suitability of this animal as a pet, among other reasons, because there was, “...inadequate information on the pathogenesis of rabies in ferrets.” (Dodter 1995); euthanasia and immediate brain dissection was still recommended for ferrets that bit humans.

The attitude towards ferrets changed in the 1990s, as demonstrated by this excerpt from the Centers for Disease Control and Prevention:

“The European ferret (*Mustela putorius*) has grown in popularity as a companion animal, but little is known about how the virus causes disease in this species. Although national ferret societies report annual sales exceeding 50,000 animals and more than one million are maintained as pets in the United States, rabies is rarely reported in ferrets. Since 1958, only 21 rabid ferrets have been documented by CDC through national surveillance activities. An important and often-asked question is whether ferrets, which are known to have bitten small children, make appropriate domestic pets. This issue should be considered separately from concern over the animal's potential role in rabies transmission. However, once the issue of rabies was raised in the debate over ferret ownership, a number of studies were designed to investigate the pathogenesis of rabies in ferrets to provide scientific guidelines in the event of ferret bite. While such information is available for cats and dogs, the virus shedding period of an infected ferret is unknown. Hence, ferrets that bite are frequently euthanized rather than quarantined, even if the ferret has been vaccinated. In a preliminary study designed to investigate the transmission and clinical course of rabies--a study that can be followed as an example in other species--ferrets were inoculated with street rabies virus of skunk origin. Susceptibility was shown to be directly related to the inoculation dose of rabies virus, and the incubation period was found to be inversely related to dose. Incubation periods ranged from two weeks to more than three months. The typical clinical presentation included paresthesia, fever, hyperactivity, weight loss, ataxia, and ascending paralysis. Morbidity periods were approximately four to five days. Rabies antigen was detected upon examination of brain tissue of 33 clinically rabid ferrets by immunofluorescent microscopy; 16 ferrets remained clinically normal and were negative for rabies antigen at necropsy. Rabies virus was not isolated from any oral swabs, but was recovered from a salivary gland collected at necropsy from one rabid ferret. The proportion of ferrets that developed rabies virus neutralizing antibodies (VNA) was directly related to the inoculum dose and usually appeared concomitantly with clinical signs. One ferret that presented with clinical signs of rabies seroconverted and eventually recovered but with severe paralytic sequelae; VNA were detected in the cerebrospinal fluid. These preliminary data are based on a single rabies variant of skunk origin but are in agreement with a prior investigation utilizing a European red fox rabies variant. These studies suggest that ferrets are not idiosyncratic in their response to rabies infection and that quarantine and observation periods may be reasonable to consider as additional data become available. Several states have already initiated quarantines for ferrets. Clearly, the pathogenesis of rabies, including viral excretion, may vary depending upon the dose, the route, and the strain of virus. While the likelihood of rabies in ferrets may be low, caution is warranted.” (p. 403, Rupprecht *et al.* 1996)

The Centers for Disease Control and Prevention biologists from the Rabies Section (Rupprecht *et al.* 1996) report only 20 documented rabid ferret cases from 1958 to 1996. An excerpt is provided:

“Although national ferret societies report more than one million ferrets maintained as pets, only 20 rabid ferrets have been documented since 1958.” (p. 402, Rupprecht *et al.* 1996)

California Department of Health Services staff documented one case of a ferret contracting rabies in California:



“Twelve cases of ferret rabies have been documented in the United States, six of them since 1985 (Table 7). It is either known or reasonably assumed that essentially all of these ferrets had been bitten by rabid wild animals...In two incidents, one of which was in California, escaped ferrets developed rabies shortly after they were recaptured. Rabies-infected ferrets also have been purchased in pet shops.” (pp. 13-14, Constantine and Kizer 1988).

“At least five pet ferrets have developed rabies in the United States, including an illegal escapee that was trapped in California in 1985.” (p. 18, Constantine 1986).

The Centers for Disease Control and Prevention biologists from the Rabies Section (Rupprecht and colleagues) state that currently, at least in the USA, rabies is a rare disease and is relegated largely to non-pet vectors:

“Over the last 100 years, rabies in the United States has changed dramatically. More than 90% of all animal rabies cases reported annually to the CDC now occur in wildlife, whereas before 1960 the majority were in domestic animals. The principal rabies hosts today are wild carnivores and bats infected with several viral variants. Annual human deaths have fallen from more than a hundred at the turn of the century to one to two per year despite major outbreaks of animal rabies in several geographic areas. Modern day prophylaxis has proven nearly 100% successful; most human fatalities now occur in people who fail to seek medical treatment, usually because they do not recognize a risk in the animal contact leading to the infection. Although these human rabies deaths are rare, the estimated public health costs associated with disease detection, prevention, and control have risen, exceeding millions of dollars each year. Cost considerations must be weighed along with other factors in addressing issues such as the appropriate handling of nontraditional and exotic pets, future guidelines for rabies prophylaxis, and novel methods of disease prevention.” (p. 400, Rupprecht *et al.* 1996)

“Human rabies is uncommon in developed nations. In the United States, scores of deaths from rabies were documented annually in the early 20th century. Now, fewer than three deaths are reported each year, most without a documented exposure. Still, this zoonosis exerts a disproportionate influence on health resources because of the necessity for prophylactic measures, including the administration of biological agents. Continued apprehension is rooted in ancient superstitions, the dramatic manifestation of hydrophobia, and the extreme case fatality ratio. Cases of the disease are preventable, but enzootic foci are plentiful and not eliminated easily. The public may not appreciate that their surroundings are a veritable sea of rabies, maintained by common animals. Globally, dogs are the major reservoirs. Bites from rabid dogs cause tens of thousands of deaths per year and prompt prophylactic treatment in millions of persons. Recent assessments illustrate that the magnitude of rabies in developing countries is grossly underestimated. Exposures may occur as single events, or one rabid animal may expose multiple people. In the United States, 15,000 to 40,000 people receive prophylaxis annually. Prophylaxis is effective and safe, but it is expensive and is often used inappropriately.” (p. 2626, Rupprecht and Gibbons 2004)

“In North America, raccoons, skunks, bats, and foxes are the primary reservoirs responsible for transmission [of rabies]...Rabies in small mammals (such as mice and squirrels) is rare, and transmission from them to humans remains undocumented.” (p. 2627, Rupprecht and Gibbons 2004)

The Rabies Branch of the Centers for Disease Control and Prevention publishes an annual report of their surveillance of rabies cases in USA and Puerto Rico. Summaries for the last decade are as follows:

2002: 7,967 animal cases (1 case in a ferret), 3 human cases (from bats) (Krebs *et al.* 2003)  
 2003: 7,170 animal cases (1 case in a ferret), 3 human cases (Krebs *et al.* 2004)  
 2004: 6,836 animal cases (0 cases in ferrets), 8 human cases (none involving ferrets) (Krebs *et al.* 2005)  
 2005: 6,417 animal cases (0 cases in ferrets), 1 human cases (unknown source) (Blanton *et al.* 2006)  
 2006: 6,940 animal cases (3 cases in ferrets), 3 human cases (from bats, dog) (Blanton *et al.* 2007)  
 2007: 7,258 animal cases (0 cases in ferrets), 1 human cases (probably from bat) (Blanton *et al.* 2008)  
 2008: 6,841 animal cases (0 cases in ferrets), 2 human cases (both from bats) (Blanton *et al.* 2009)

The Centers for Disease Control and Prevention biologists from the Rabies Section states the following currently accepted protocol for ferrets:

“According to experimental data and epidemiologic observations, some domestic species may be observed for signs of rabies. A healthy dog, cat, or ferret that exposes a person may be observed for 10 days. If the animal remains healthy, the patient does not need prophylaxis; only wound care is needed. If the animal sickens with signs compatible with rabies, it should be euthanized and the brain should immediately be examined. If infection is confirmed within 24 to 48 hours after the animal is euthanized, there is adequate time to begin prophylaxis. After exposure to wildlife in which rabies is suspected, prophylaxis is warranted in most circumstances. Vaccination is discontinued if tests of the animal’s brain tissue are negative for infection.” (p. 2628, Rupprecht and Gibbons 2004)

Some veterinarians disagree with the Centers for Disease Control. Nagami (2004) is an example, who states:

“Unlike dogs and cats, which show symptoms of rabies within ten days of infection, ferrets and skunks may harbor the virus without symptoms for several weeks. A ten-day quarantine, as for dogs and cats, will not detect all rabid ferrets, and rabies vaccination of a bitten person may thus be dangerously delayed. Many authorities recommend that any ferret biting a human should be humanely killed and its brain examined for rabies.” (p. 223, Nagami 2004).

Veterinarian R. Ball describes a current vaccine product:

“Rabies is rare in ferrets, but, as with all mammals, the potential for disease is real. A killed vaccine, IMRAB 3 (Merial, Inc.), is approved for use in ferrets.” (p. 40, Ball 2002)

The California Department of Food and Agriculture apparently approved the use of IMRAB rabies vaccine designed for ferrets in 1990 (letter dated February 6, 1990, Dr. L.C. Vanderwagen, Chief, Animal Health Branch, CA Dept. of Food and Agriculture). Most pro-ferret organizations apparently encourage pet owners to vaccinate their ferrets for rabies (e.g., American Ferret Association [2006]).

The National Association of State Public Health Veterinarians, Inc. (2008) recommends in their *Compendium of Animal Rabies Prevention and Control*:

“Domestic Animals. Local governments should initiate and maintain effective programs to ensure vaccination of all dogs, cats, and ferrets and to remove strays and unwanted animals. Such procedures in the United States have reduced laboratory-confirmed cases of rabies in dogs from 6,949 in 1947 to 71 in 2006 (2). Because more rabies cases are reported annually involving cats (247 in 2006) than dogs, vaccination of cats should be required (2). Animal shelters and animal-control authorities should establish policies to ensure that adopted animals are vaccinated against rabies. The recommended vaccination procedures and the licensed animal vaccines are specified in Parts II and III of this compendium, respectively.” (p. 1, National Association of State Public Health Veterinarians, Inc.)

The American Ferret Association, Inc. (2006) recommends vaccinating ferrets with USDA licensed vaccine products labeled for use in ferrets for both canine distemper and rabies.

Phillips and Shimbo (1990) claim that the ferret rabies scare was manufactured by anti-ferret organizations.

#### **10.1.4. Reports from Agencies**

Numerous States and Provinces responded to the CSUS questionnaire regarding rabies cases involving ferrets, and if any of those cases resulted in transmission of the virus to humans. The majority of respondents indicated that there were no cases in their State or that such data did not exist. The following table summarizes the results.

| Are there instances of domesticated ferrets contracting rabies ( <i>Lyssavirus</i> ) in your State? |                                                                                                                          |                                                                                           |               |         |           |                   |                    |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------|---------|-----------|-------------------|--------------------|
|                                                                                                     | No                                                                                                                       | Don't know                                                                                | 1             | 1 to 10 | 10 to 100 | Estimate 0 – 1/yr | Estimate 1 – 10/yr |
| Response of States & Provinces                                                                      | AL, AZ(2), CO, DC, DE, GA, IA, ID, IL, KS, MA, ME, MN(2), MO, MT, NB, NS, NY, OH, OR, RI, UT, VI, VT, WA, WA, WI, WV, WY | BC, CA, DE, HI, IN, KY(2), MN, NE, NH, NJ, NM, NV, NY, OK, OK, PA, SC, TN, WA, WA, WI, WY | AR, CT(2), MI | ND, NJ  | blank     | AK, IA, SD        | blank              |

In his questionnaire responses, Raymond Connors (Connecticut Department of Agriculture Animal Control Division) reported 1 case of a rabid ferret transmitting the virus to a human (but no additional info was given). The questionnaire response is copied verbatim:

“There are 1 instances over the time period of record keeping. Records have been kept since year: 1991.

If yes, please indicate how many of these instances resulted in ferrets transmitting the rabies virus to humans: 1.”

In her questionnaire responses, Dr. Michele Finateri (Michigan Department of Agriculture, Animal Industry Division) reported 1 rabid ferret case. The questionnaire response is copied verbatim:

“There are 1 instances over the time period of record keeping. Records have been kept since year: 1978.

If yes, please indicate how many of these instances resulted in ferrets transmitting the rabies virus to humans: 0.”

In her questionnaire responses, biologist Linda DiPiano (New Jersey Department of Environmental Protection, Division of Fish and Wildlife) reported 3 rabid ferret cases. The questionnaire response is copied verbatim:

“There are 3 instances per year. “Since raccoon variant entered the state in 1989 (3 cases/20 yr).

If yes, please indicate how many of these instances resulted in ferrets transmitting the rabies virus to humans: 0.”

In her questionnaire responses, Dr. Susan Weinstein (Arkansas Department of Health) reported 1 rabid ferret case. The questionnaire response is copied verbatim:

“There are 1 instances over the time period of record keeping. Records have been kept since year: way back but electronic records from 1990 on; one instance was June 1996: AR Dept Health records, Lab# L-239; I have fairly complete information concerning this one case.

If yes, please indicate how many of these instances resulted in ferrets transmitting the rabies virus to humans: 0.”

California Department of Health Services did not respond to the CSUS questionnaire.

### 10.1.5. Summary and Opinion

Nothing in this report should not be construed as medical advice.

The medical community and various State agencies have reversed their stance on rabies issues pertaining to ferrets, from emphatic statements in the 20<sup>th</sup> century that ferrets are not appropriate pets because of their proclivity to bite and the absence of effective vaccines, to neutral statements in the 21<sup>st</sup> century that ferrets should receive rabies vaccinations like other household pets. The Centers for Disease Control and Prevention state that currently, at least in the USA, rabies is a rare disease and is relegated largely to non-pet vectors.

The vaccination of ferrets for rabies (and distemper) could be made mandatory, regardless of whether ferret ownership is legal or illegal in California. Ferrets sold after about 12 weeks of age should be vaccinated before sale. For those sold before 12 weeks of age, the new owner could be required to show proof of rabies vaccination by a certain time, such as 13 weeks of age. Every effort should be made to prevent ferrets from escaping confinement; any stray or feral ferret captured could be mandatorily held in quarantine until it is indicated that they are free of rabies. Public education and outreach should also be implemented. Provided that effective mitigation measures are incorporated into a legalization action, this

potential impact upon human health could be reduced to a less-than significant level. This issue may not need to be analyzed further in the EIR.

## 10.2.AGGRESSION TOWARDS HUMANS

### 10.2.1. Reports of Aggression from the Literature

Numerous literature sources suggest that the ferret can function as a docile household pet. The modern ferret has apparently been selectively bred for docility. Statements from Marshall Farms Group, Ltd. are reproduced here:

“Marshall Farms Group Ltd has been raising domestic ferrets (*Mustela putorius furo*) for over 70 years. Besides being a popular household pet, the ferret is also an important animal model in biomedical research. Marshall’s has been a pioneer in many aspects of ferret health care, husbandry, and reproduction. Years of careful breeding within a large, outbred colony has consistently resulted in healthy, friendly, and well-adapted ferrets.” (Marshall Farms Group, Ltd., pers. comm. 2009)

“Marshall Farms has decades of experience in the development and implementation of breeding programs for multiple species of domestic animals, including ferrets. A large, proprietary software database serves to archive and retrieve literally thousands of biologically relevant traits that are available to describe and profile each individual animal. These traits include phenotype, such as conformation, coat color, and any anatomical flaws, such as crooked teeth. Another category of traits represent qualities of individual temperament. Reproductive traits are also evaluated, including litter health and mothering abilities. Pedigrees are maintained and statistical assessment of trait characteristics allow for effective emphasis on desirable qualities, as well as attenuation or elimination of undesirable qualities. In general, the primary areas of emphasis for the breeding program include friendly, docile temperament; lack of physical or physiological abnormalities; and excellent overall health. These areas of emphasis serve to produce a ferret that is a gentle, well-adjusted pet, as well as an adaptable, healthy model in the biomedical research environment. To that end, the Marshall ferret has undoubtedly evolved not only from its original wild polecat ancestors, but also from its domesticated ancestors as well. Because this highly successful approach to breeding and raising ferrets is proprietary, information relative to the animal genetic database is largely unpublished.” (Marshall Farms Group, Ltd., pers. comm. 2009)

Regardless of selective breeding, the ferret still has a propensity to bite (Boyce *et al.* 2001), and has been nicknamed “ankle nipper” (Jeans 1994). The pet manual *Ferrets for Dummies* explains that bites may be motivated by emotions such as those involved in play, quick movements, loud sounds, fear, or alarming or new situations, hunger or protection of food, or xenophobia. The following are excerpts that describe problem biting behavior:

“Understanding your Dracula in fuzzy’s clothing. Once in a blue moon, a person will adopt a ferret that’s just plain mean—in other words, she’s a biter—and nothing much can be done about it...Ferrets can bite for many reasons...Humans are the root of most biting evils...Not all ferret bites should be considered attacks. In fact, most aren’t. Ferrets often have a good reason to bite; biting is sometimes the only way a ferret can communicate her needs or wishes...You must recognize the difference between playful biting and aggressive biting and try to correct both. An aggressive biter may bite you and hold on, or she may bite so hard that she draws blood. The pain caused by an aggressive biter is unmistakable. Playful bits include mouthing, light nips, and even ‘nip and runs.’ Although playful bits cause little to no discomfort, they may cause future problems.” (pp. 319-320, Schilling 2007).

“Among the other surprises in store for new ferret owners...is a tendency to bite hard if hungry or upset.” (p. 59, Williams 1984).

“Ferrets can bite but usually only nip in play. When a ferret bites the teeth sink in and the jaw locks. This hurts and is as painful as a kick by a horse.” (p.3, Lewington 1988)

*Ferrets for Dummies* also provides suggested remedies for getting an aggressive ferret to release its locked jaws upon a human, and these remedies include distraction with bait, inserting a distasteful compound into the mouth, squeezing the



jaws or neck, or inserting an object between the victim's skin and the ferret's teeth (Schilling 2007). Lewington (1988) suggests the following remedies for a ferret that will not release its bite:

"In the unfortunate case of getting bit on the finger push into the ferret's mouth with the finger to make it gag. This is easier said than done of course so alternatively plunge your finger with ferret attached into a sink of water and the ferret will let go." (p. 4. Lewington 1988)

Another pet ferret manual suggests the use of bitter sprays (available at pet stores) for a "...ferret that is 'hanging' on to you." (p. 48, Jeans 1994).

Some authors blame humans for the biting behavior of ferrets, and put the responsibility upon owners and other humans to properly handle or train ferrets so that they don't bite:

"Domestic pet ferret was domesticated 500 years before cats and is not a wild animal. The pet ferret cannot revert to a semi-wild state the way cats can. If it escapes outdoors a pet ferret can only survive for two or three days. You will need to teach your ferret what is acceptable behavior when it is being handled. A healthy ferret that is used to being handled does not have a tendency to bite. Robin Downing D.V.M. 1997. Pets: Facing ferrets. Denver Post. Denver, Colorado. December 7, 1997. pg. 9.

"Humans are the root of most biting evils...Not all ferret bites should be considered attacks. In fact, most aren't. Ferrets often have a good reason to bite; biting is sometimes the only way a ferret can communicate her needs or wishes" (p. 319, Schilling 2007).

Following are some excerpts of recommendations from veterinarians:

"A word of warning, ferret can and do bite and can inflict quite a nasty wound. Small children are often the victims as they are not able to handle the ferret correctly. Public officials may still require the euthanasia of a ferret that bites someone, even if it has been vaccinated against rabies." Jill Bowen (veterinarian). 1997. Ferrets have merit as pets, but there are drawbacks. Roanoke Times & World News. Roanoke, VA. November 16, 1997. Pg. NR15.

"There are many Public Health and Animal Control Departments across the country who still view ferrets as dangerous wild animals. There are areas where ferrets are illegal or are confiscated and euthanized if they bite a human, even if they were appropriately vaccinated for rabies...Your Animal Control Department can tell you what, if any, laws exist regarding ferrets...you should at least vaccinate your ferret for rabies yearly...whatever the regulations, you are legally responsible if your ferret bites a human, so be responsible." Alison Riley (DVM, owner of Pet Med Animal Hospital in Dubuque) 2007. Ferrets not always a welcome pet. Telegraph – Herald. Dubuque, Iowa. December 2, 2007. Pg. E10.

"I disagree with those authorities who claim that ferrets are wild animals. While they may arguably be considered 'exotic', they are definitely domestic. Having been raised by man for more than 2,000 years, pet ferrets are unable to survive in the wild...my advice to ferret owners includes the following: teach your young ferret not to nip...and do not have human infants unattended with your ferret." Mark K. Finkler (Roanoke Animal Hospital). 1997. Take precautions with pet ferrets. Roanoke Times & World News. Roanoke, Virginia, January 6, 1997. Pg. A4.

Ferrets apparently vary widely in their temperament:

"Aggression, excitement, and play are at times difficult to differentiate in the domestic ferret and may require several moments of observation to distinguish whether the behavior is play or aggression." (p. 703, Boyce *et al.* 2001)

"Ferrets must be really tame and easy to pick up and handle. You should be able to curl your ferret into a ball and toss her over the hedge for your assistant to catch. If you cannot do this sort of thing you have not trained her well." (p. 171, Glasier 1982)

“Ferrets vary considerably in temperament, ranging from non-aggressive pet animals to more unpredictable animals which are maintained for rabbiting. Laboratory ferrets are normally reasonably easy to restrain, but occasionally a particularly aggressive animal may be encountered.” (p. 182, Flecknell 1991).

“Atlanta’s Center for Disease Control reports a jump in severe ferret bites of infants and very young children that range from nipped ears and noses to lost fingers. But, an informal poll of veterinarians suggests ferrets make lovable pets when given proper care and could be an up-and-coming companion for urban, working Americans.” (p. 59, Williams 1984)

Many authors give explanations as to why a ferret may bite or attack a human; the following excerpts are examples:

“Ferrets are social, curious, and very playful. It is this playfulness, a behavior they exhibit throughout their adulthood, which makes them attractive to many as pets. When handled gently, ferrets rarely bite, although like young puppies and kittens, juveniles tend to be playful and may nip. They also may become startled by loud noises and excitement, or by unexpected handling. Routine handling will greatly diminish these reactions. A startled ferret raises its fur, screeched, humps it back, and may bite. Simple reassurance reestablishes its composure.” (p. 37, Ball 2002).

“Toe nipping is the most common misbehavior of young ferrets. It seems to happen for two reasons: not making the connection between the wiggling creatures and their two-legged friend, and a desire to play chase and have interaction.” (Morton and Morton 1995)

“Some 33 infants and young children have been reported in California as having been attacked by pet European ferrets (descendants of the European polecat, *Mustela putorius*, not to be confused with the endangered black-footed ferret, *Mustela nigripes*, of the Great Plains). The animals seem attracted to babies, perhaps due to odors resembling those of suckling rabbits. Typically, attacks are made when parents are absent or asleep; the ferret escapes its cage and jumps into the baby’s crib. One infant died; others nearly bled to death. One lost her nose, another half of both ears. Up to hundreds of bites were rapidly inflicted on all parts of the face, the result resembling ground beef according to some observers, although all exposed parts of the body are attacked as well. Older children and adults were bitten on the face and extremities, the animal often holding on tenaciously until killed or pried loose. Bites may be unreported to avoid loss of illegal ferrets. Sometimes ferrets are confused with weasels due to inability to differentiate them.” (p. 617, Marcuse 1987)

“Like all carnivores (see the first section in this chapter), ferrets have large canine teeth that can be rather intimidating. A ferret’s teeth usually hang lower than his lip flap and are in full view. Although any animal with a mouth can and will bite under certain circumstances, I’ve found the biting ferret to be the exception rather than the rule. Most ferrets use their canine teeth to show off to their friends and to eat. When a ferret nips, she does it out of fear or play. An occasional warning nip may be a sign of the ferret’s disapproval of one thing or another. (See Chapter 3 for more about the laws governing ferret bites.) Make no doubt about it, the bite of a disgruntled ferret is painful and can draw blood. Take measures to make sure bites don’t happen, and unless medically warranted for your ferret’s health, don’t alter his canine teeth; leave them right where they belong.” (p. 14, Schilling 2007).

“The domestic ferret’s reputation in recent years has been tainted by a lack of knowledge. This general failure to understand domestic ferret behavior has promoted labels such as ‘wild or nondomestic,’ ‘vicious biter,’ or ‘dangerous animal.’ ” (p. 698, Boyce *et al.* 2001)

“Although ferrets are generally friendly and can be handled without difficulty; females with young or hungry animals will bite.” (p. 43, Scharmann and Wolff 1987).

Many pro-ferret authors, such as Phillips and Shimbo (1990), attribute incidences of ferrets attacking humans to neglect, abuse, or provocation of these ferrets by humans, to illness in ferrets, or to a mis-assignment of the attack to a ferret rather than another animal species such as dog.



Other authors conclude that ferrets attack for no reason at all (*i.e.*, without provocation). This excerpt provides an example:

“Ferret attacks commonly occur while the child is sleeping or lying down. Ferrets have even climbed into a child’s crib to attack. The most severe injuries have been in younger and defenseless children. Ferrets have bitten children even under direct parental supervision. In contrast to dogs and cats, which generally bite to protect territory or food or when threatened, all reported ferret attacks on children appear to be unprovoked.” (p. 426, Applegate and Walhout 1998).

“In 1988, physicians in Denver, Colorado, reported three cases of severe facial injuries to infants from attacks by pet ferrets. All three involved babies less than five months old, left briefly unattended in their cribs. In one of the cases a three-month-old girl was placed in her crib with her bottle. In just a few minutes, the family ferret managed to climb in and chew off forty percent of both her ears. Another patient in the series, a six-week-old boy, lost most his left ear and, in another report, a baby girl lost her nose to a ferret attack.” (p. 221, Nagami 2004).

There may be a scientific basis for the occasional attack of infants by ferrets. The small size of infants may be a factor, as follows:

“In this species, predatory reactions mainly consist of instinctive behavioral patterns that are elicited only by specific external stimuli (Apfelbach, 1973; Eibl-Eibesfeldt, 1956; Goethe, 1940; Gossow, 1970; Wustehube, 1960). When elicited these reactions are performed in a predictable and quantifiable way. According to earlier studies (Apfelbach and Wester, 1977), an important external factor is the size of the prey; an increase in its size decreases the probability of a successful attack. Prey killing, in turn, does not depend on hunger alone, since hungry and satiated animals react equally to potential prey (Apfelbach, 1978).” (p. 179, Apfelbach 1978a).

Apfelbach and Wester (1977) found that when hunting, ferrets innately tend to aim at the most anterior part of the prey and bite into it; they also confirm that prey-catching reactions are elicited by movement of animals smaller than them.

The earliest reference [found in this study] on attacks by ferrets upon humans was Jesse (1834) and Fennell (1843), who gave these two sensational accounts:

“Goldsmith says, the ferret has been known to attack and kill children in the cradle; and Mr. Jesse relates, that at Kingston in Surrey, some years ago, a poor woman, having left her child (about six months old) in a cradle, while she went to market, a large ferret, which was formerly shy and gentle, made a ferocious attack upon the helpless infant. The neighbours heard the child’s screams for more than half an hour; and it was not until the return of the mother, that it was found and almost killed. She carried the child to a surgeon, who found that the face, neck, and arms were dreadfully lacerated, the jugular vein and temporal artery were opened, and the eyes greatly injured. Having stopped the flow of blood, the surgeon accompanied the mother to her home, on entering which, the child, somewhat recovering from its exhausted state, began to cry, and in an instant the ferret rushed from his hiding place, and with his head erect, boldly approached towards the infuriated parent, who still had the infant in her arms. The surgeon kicked the ferret, but the animal tried to seize his leg; and not until his back was broken by repeated kicks, did he discontinue his eager attempts to renew his sanguinary feast; and, indeed, whilst in the agonies of death, he seemed to make vain efforts to regain his prey.” (p. 89, Fennell 1843; [see Jesse (1834) for a similar account]).

“A bargeman, of the name of Isles, procured a ferret to kill the rats which did great mischief in his barge. Not seeing the ferret for a considerable time, and supposing that it was feasting on some of its prey, the man went to sleep, but was awakened early next morning by the ferret making a regular attack upon him. The animal had seized him near his eyebrow; and the man having vainly attempted to shake him off, at length cut off the body with a knife, but the head still stuck so fast as to be with difficulty removed.” (p. 90, Fennell 1843).

The California Department of Health Services attempted to compile these data:

“In order to better define the nature and extent of ferret attacks and in response to requests for information from the Department of Fish and Game and the Department of Food and Agriculture, the California Department of

Health Services in early 1986 solicited reports about ferret attacks from neighboring states, federal and local government agencies, and professional organizations. During the subsequent two years, information was obtained on 452 ferret attacks spanning the ten-year period 1978 through 1987. A total of 425 attacks on people were reported from California, Oregon, and Arizona. Of these attacks, 100 were in California, where it has been illegal to keep ferrets as pets since 1935. Also reported from a total of 18 states were 63 unprovoked attacks on infants and small children. Several of these were near-fatal attacks. One additional case, a fatal attack, was reported from London.” (p. 466, Kizer and Constantine 1989).

Our literature review revealed only two cases of deaths resulting from attacks from ferrets that were kept as household pets:

- In 1978 in London, two pet ferrets escaped from their cage and attacked and killed a baby in its pram (baby carriage). The Royal Society for the Prevention of Cruelty to Animals (RSPCA) warned that animals such as ferrets should never be left alone with young children. Anonymous. 1978. Warning by RSPCA after ferrets kill baby. The Times, London, October 25, 1978
- Vivian Bettencourt, a 2 1/2-month old baby died after being attacked by the family’s pet ferret, on February 1, 1991, in Portland, Oregon (Associated Press 1991). In 1986, an 8-month old baby in southern Oregon was bitten more than 200 times while sleeping in a crib. Associated Press. 1991. Baby killed by family’s pet ferret. Times Daily, Wednesday, February 6, 1991, page 3A.

Numerous other cases of non-lethal attacks upon infants by ferrets were found in our literature search. The following are excerpts and quotes of some, but no all, of the newspaper articles found in this study’s newspaper article research that pertain to bites and attacks [presented in no particular order]:

- At 29 days old, in a playpen 10 feet from her sleeping father, Michelle Bower's face was devoured by her family’s pet ferret. “The ferret completely ate off my nose and it mangled my lips pretty badly and kind of got my finger,” Michelle, now 24, said Tuesday. Ferret attack victim to appear on ‘Dr. 90210’ to get facial surgery. Norton, F. 2009. Finishing touches of beauty. Nevada Appeal, October 18, 2009.
- A 5-week-old girl was in stable condition after being bitten at least 50 times by a pet ferret. Police charged her parents with felony child endangering. Anonymous. 1998. Family Ferret Bites Baby Girl 50 Times. Chicago Tribune, Feb 23 1998. Page 7. Also cited in New York Times: Anonymous. 1998. Ferret Attacks newborn; parents are charged. New York Times. Feb 23, 1998, page A12.
- In Cary, N.C. in 2004, police have charged a Cary couple after their pet ferret attacked their infant daughter. The 6-month-old went to the hospital with several bite wounds. A hospital social worker called police. Authorities charged John Taylor and Donna Taylor-Colville with misdemeanor child abuse. Police say the couple could face additional charges. Anonymous. 2004. Cary Couple Charged In Ferret Attack. WRAL.com, July 9, 2004.
- 7-year-old South Whitehall Township boy was attacked yesterday by a neighbor's pet ferret, police said. Kenneth Morris, 1710 N. 17th St., was treated at Allentown Osteopathic Medical Center last night with bites on his face and leg, said police Cpl. Harry Bensinger. Ifateyo, A. 1994. Ferret Shot By Police After Biting Child. Morning Call, October 30, 1994, page B07.
- Yorba Linda—Two infants were attacked by a pet ferret and suffered puncture wounds to their faces, hands and arms, Brea police said. The 3-week-old twin boys were in stable condition Wednesday night at Kaiser Permanente Medical Center in Anaheim after the attack in their home in Yorba Linda at 7 p.m. Tuesday. Det. Rick Edwards said the 2-pound ferret was destroyed. Authorities said it did not have rabies. Author unknown. 1997. Los Angeles Times, dated December 18, 1997, Orange County Section.
- A toddler was attacked by a ferret that got into a house in Palmerston North through a cat door. Then they found that Harry’s right arm had been extensively scratched and bitten and was bleeding profusely and swelling. He also

had two bites above his right eye, bites on his other arm and in several other places... The Pascoes said the ferret had visited them before, sneaking in through the cat door about two weeks ago in the early evening. They had scared it out. 'It's obviously somebody's pet,' Mr Pascoe said. Anonymous. 1998. Pet ferret attacks sleeping toddler. Dominion, NZ. December 17, 1998, page 1.

- A 4-month-old boy's eyelid was bitten by a pet ferret named Patches, which climbed into the sleeping infant's crib, police said Friday. The baby was taken from 5331 Brady Drive to St. Mary's Hospital, where five stitches were required Thursday to repair his right eyelid, officer Phil Moore said. Ingersol, B. 1998. Ferret climbs into crib, bites sleeping baby boy. Wisconsin State Journal, December 12, 1998, Page B2.
- During the late morning on Independence Day, members of Ferrets Anonymous held a picnic near the corner of Sixth Avenue and Laurel Street. The group, founded by Wright, is a national organization fighting to legalize the ownership of the little, long, furry animals. A little girl whose family was picnicking nearby was playing with a baby ferret when she started to cry. She told her mother, Cheryl Clark, that a much larger ferret had bitten her on a forearm. Jones, H. 2000. 'The ferret was innocent,' juror says in biting trial but pet's owner guilty on weapon charge. San Diego Union-Tribune, Feb 5, 2000, page B2.2.7.
- In 2000, Cassandra O'Connell, A 10-day old girl lying in her crib was attacked by two pet ferrets that may have been attracted by milk on the child's breath, in Eau Claire, Minnesota. The ferrets inflicted more than 100 scratches, gashes, and bite marks on the baby's face before the family dog jumped in to save the infant, who is expected to recover completely. Jones, M. 2000. Pet ferrets attack 10-day-old girl. Milwaukee Journal Sentinel June 20 2000. A woman credits the family dog for breaking up an attack by two pet ferrets as they bit her 10-day-old baby repeatedly in the face. The police report said Cassandra was bitten more than 100 times on the nose, forehead, left cheek and near her eyes. Anonymous. 2000. Dog saves baby from pet ferret attack. Madison Capital Times. June 29, 2000, page A4.
- A woman jailed after four of her infant daughter's toes were gnawed off says the family's pet ferret did it, not their pit-bull pup as police had said. 'The way the bite marks were on her foot, the ferret being out of its cage, I knew it wasn't the dog,' Mary Hansche told KTBS-TV. Anonymous. 2006. Ferret – not pit bull – bit infant's toes, mother says. Orlando Sentinel, Dec 21, 2006, page A12.
- The mother of a woman being treated in hospital for an infection doctors believe was transmitted by a ferret bite, wants the weasel-like pets banned. Jacinta Cillis, 25, is being treated at the Civic Hospital for what's believed to be tularemia, an infectious disease that causes vomiting, fevers and chills, fatigue, and a sore throat. It's usually passed on to humans from wild animals, said Gemmill. The region's associate medical officer of health is urging people to avoid having ferrets as pets after two people have recently reported being bitten. Anonymous. 1990. Ferrets too vicious to be pets, says health officer. The Ottawa Citizen, Cnd. Jun 30, 1990, page A17.
- "I get most my bites from ferrets...even the nicest ferrets that never bite anyone have bitten me." – Dr. Julie Whittington, College of Veterinary Medicine, University of Illinois, Small Animal Clinic. Paul Wood. 2002. New UI vet walks on the wild side; from otters to snakes, exotic pets welcome. News Gazette. Champaign, Ill. January 17, 2002. Pg. B1.
- In brief, Stiller didn't enjoy his scenes with this furry little rodent. After all, it bit him. 'Because it did this crazy turn thing and literally attached itself to my chin, and then it didn't let go. And it was holding on to my chin. It was this surreal thing, where's like—okay, the ferret's on my chin. Then I had to go and get a rabies shot.'... 'But I didn't provoke it at all!' Stiller protests. 'Their teeth are sharp—like razors...' J. Portman 2004. Ferret's bite was no joke to Ben Stiller: He was bitten recently while filming. Vancouver Sun, B.C. Jan 16, 2004, Page D5.
- Ogden—A state agency is monitoring the welfare of a 14-month-old boy who was bitten 300 times by a pet ferret at his home earlier this month. Anonymous. 1992. Ferret Bites Toddler 300 times. The Salt Lake Tribune, May 21, 1992. Page C4.

- Lenny Lowery contends he walked into a pet store looking for a ferret and walked out after being so badly bitten by one that it cost him \$4,000 in medical bills. The pet store owners counter that Lowery, without authorization, opened a sleeping ferret's cage, startled the animal and was bitten on the arm. Anonymous. 1990. Wichitan sues pet store over ferret bite. Wichita Eagle, Feb 7, 1990, page D1.
- West Palm Beach - A pet ferret with razor-sharp teeth bit a 6-month-old baby at least 100 times before a neighbor killed the animal by pitching it against a wall. Anonymous. 1988. Pet ferret bites baby at least 100 times. St. Petersburg Times. Aug 20, 1988, page B1.

Constantine and Kizer (1988) also reviewed the popular literature for ferret attacks. Constantine and Kizer (1988) estimated that the rate of ferret attacks in California were 1 attack per 1 million human residents per year; they estimated a rate of 7.4 and 25 for Oregon and Arizona, respectively (Constantine and Kizer 1988).

The following quote sums up the available literature on ferret attacks:

“There have been rare but dramatic reports of ferret attacks in the medical literature.” (p. 425, Applegate and Walhout 1998).

The following quote demonstrates the challenge in enumerating ferret attacks based on the available literature:

“To date [1998], no firm data exist on the incidence of ferret bits or attacks on humans. Most states do not keep statistics on ferret bites, and in some states, such an attack is not reportable.” (p. 426, Applegate and Walhout 1998).

“The true incidence of ferret bites is unknown because ferret bites are not reportable in most states. During an 11-month period in Arizona, the ratio of reported bites to the estimated pet population was 0.3% for ferrets compared with 0.4% for cats and 2.2% for dogs. It is possible that ferret bites are underreported compared with bites of other animals. When a special surveillance program for ferret bites was begun in North Carolina, 16 bites were reported in a six-month period (John Freeman, DVM, personal communication, April 24, 1987).” (p. 2006, Paisley and Lauer 1988)

“Bites may be unreported to avoid loss of illegal ferrets. Sometimes ferrets are confused with weasels due to inability to differentiate them.” (p. 617, Marcuse 1987)

This data deficiency was confirmed in our questionnaire responses, where many agencies do not adequately or regularly track cases of ferret attacks. Results are discussed later in this report.

### **10.2.2. Relative Risk of Injury and Acceptable Risks**

Agencies and anti-ferret groups often cited these attack cases as proof that ferrets are not appropriate pets and as compelling reasons to prohibit ferret ownership. Pro-ferret groups counter that serious injuries and fatalities resulting from ferret attacks are extremely rare, and should not serve as the basis for regulatory decisions. A similar argument has been made for dogs:

“Fatal attacks represent a small proportion of dog bite injuries to humans and, therefore, should not be the primary factor driving public policy concerning dangerous dogs.” (p. 836, Sacks *et al.* 2000).

Pro-ferret groups often make the argument that dogs and cats attack people much more often than do ferrets, yet dogs and cats are legal to own and bite risks are tolerated. There are a lot of dogs and cats in the USA: in the 2009-2010 survey period, the total number of dogs owned in the USA was estimated at 77.5 million, and for cats, 93.6 million (the American Pet Products Association, Inc. 2010). Bites from small animals such as ferrets represent only a small proportion of the total number of animal bites per year in the United States:

“United States. Of an estimated 3-6 million animal bites per year in the United States, approximately 80-90% are from dogs, 5-15% are from cats, and 2-5% are from rodents, with the balance from other small animals (e.g., rabbits, ferrets), farm animals, monkeys, reptiles, and others. Some estimate that 1% of emergency visits are for



dog bite wounds. Approximately 1% of dog bite wounds and 6% of cat bite wounds require hospitalization.” (p. 3, Garth *et al.* 2009).

Following are examples of the dog to ferret bite ratio argument:

“From 1979 through 1996, dog attacks resulted in more than 300 human dog bite-related fatalities (DBRF) in the United States. Most victims were children.” (p. 836, Sacks *et al.* 2000).

“Several supporters of the current ban on ferrets, and of their classification as wild animals, argue that the animals may attack small children...However, other types of pets also attack, and even kill, small children. The Humane Society has stressed this point in its *Statement on Ferrets as Companion Animals*: ‘The HSUS recommends that children, particularly infants, never be left unsupervised with ferrets (or with any companion animal).’ In the case of dog attacks, the HSUS’s concerns are especially acute. The Journal of the American Medical Association has reported that dogs bite about 2 million people each year. In all, dogs killed 204 people between 1979 and 1988, with about 48% of fatalities resulting from pit bull attacks. Furthermore, children under the age of ten account for 70% of dog bite fatalities; children five years of age or younger account for about 50% of fatalities and infants suffer an especially high death rate from dog bites. Therefore, if the possibility of attack is the primary indicator of wildness, dogs and cats should also be classified as wild animals. Alleged savagery of ferrets toward small children must be considered in the context of attack and fatal-attack frequencies of dogs and other popular domestic pets, and cannot be relied on to justify prohibiting ownership. Given statistics showing high rates of attacks and fatalities, fairness would require the prohibition of dogs as well, especially pit bulls, since their attacks are as ‘savage’ as those inflicted by ferrets, and are far more frequent (when comparing the numbers of dogs and ferrets, and the number of dog and ferret bites).” (pp. 43-44, Herman 2000)

California Department of Health Services countered with this argument:

“The argument that European ferrets bite people less often than dogs is of course easily countered by the fact that there are many more dogs than European ferrets. There are over 50 million dogs in the United States with ball park estimates of up to one million European ferrets. Off the wall estimates for illegal European ferrets in California are any where from 10,000 to 100,000. Whatever the number is in California, there has been an enormous increase in recent years. Whereas dog bites are a reportable bite in California, European ferrets are not, and if reported at all are under ‘other animals.’ Being illegal in California, most of the bites by European ferrets are never reported unless, because of the viciousness of the attack, require medical treatment and the treating physician actually reports the incident does it show up in the statistics.” (p. 210, Hitchcock 1994)

Although ferrets may attack people much less frequently than dogs or cats, a potentially significant cumulative impact remains: ferret legalization may add incrementally to the total number of animal attacks upon humans. Various authors advance this argument:

“As ferrets become an increasingly popular pet, ferret attacks may become more common, as illustrated by these three case reports. These cases are consistent with the medical literature showing that ferrets pose a health risk for children. Whether ferrets are more dangerous than cats or dogs cannot be answered by existing data.” (p. 427, Applegate and Walhout 1988)

“The differences in reported ferret attack rates between California and adjacent states (Table 6), where pet ferrets are unrestricted, indicate that California should continue to prohibit pet ferrets, albeit by no means entirely successful in this regard. If California’s present estimated annual ferret attack rate of 1 per million humans were to rise to that of Arizona, California’s ferret-associated problem would increase 25 fold. The increase might translate into annual increases in ferret attack reports on persons of all ages from 25 to 625 per year, rabies prophylactic treatments from 5.5 to 138 per year, and known exposures to rabid ferrets from 1 to 25. In addition, there would undoubtedly be a corresponding increase in financial costs for associated medical treatment and litigation. Likewise, the adverse effects of feral ferret populations on small livestock and wildlife would be increased.” (p. 38, Constantine and Kizer 1988)

In a 1992 letter to the California Veterinary Medical Association, Dr. Larry Barrett (Chief, Veterinary Public Health Unit, CA Department of Health Services) wrote the following:

“The VPHU has been tasked with a year 2000 goal of reducing animal bites in California. Ferrets, as any other creature, may make an excellent pet for the right person but, unfortunately, they do not have a label on them that reads ‘Do not leave with small children.’ The legalization of this pet in California would definitely result in increased animal bites to infants and could potentially result in an infant’s death. Due to the public health hazards associated with ferrets, I strongly urge the Environmental and Public Health Committee not to endorse this creature as a pet.”

American Pet Products Association, Inc. (2010) reports that increasingly more owners of ferrets have no children at home.

Umbach (1997) performed an analysis of the potential impacts of ferret legalization, which is reproduced verbatim here:

“1. Bites and other attacks

DFG Views

The Department of Fish and Game has asserted that ferrets have a proclivity to bite and may bite in a frenzied fashion that is especially dangerous to small children and infants.

Ferret Proponents’ Response

Proponents respond that ferrets are less likely to bite than are dogs and cats and have not exhibited large numbers of bite incidents.

Evidence and Discussion

A few incidents of severe attacks on children or infants by ferrets have been cited. Among these was an attack on a young girl who testified at the April 15, 1997, hearing of the Assembly Committee on Water, Parks, and Wildlife. The attack had taken place when the girl was an infant. That incident caused severe facial damage, only partially repaired through plastic surgery. The most egregious incident cited by DFG, one that resulted in death, involved two starved ferrets reportedly left alone with an infant through parental neglect.

By comparison, a 1989 article in the Journal of the American Medical Association reported that “more than 2 million persons are bitten [by dogs] yearly,” with a particularly high death rate for infants. After adjusting for comparative numbers of the animals, dogs are at least 200 times more likely to bite than are ferrets, according to data for 1978 to 1988 reported in the Journal of Veterinary Medicine and calculations based on estimated numbers of dogs and ferrets.

Conclusion

Ferrets have not been demonstrated to pose an unusual risk of bites, but like all domestic animals are capable of inflicting injury, have done so in documented cases, and should never be left alone with infants or small children. Pet ferrets should be raised in a way that discourages biting and other aggressive behavior and encourages docility.” (pages 2-3, Umbach 1997)

“2. Rabies

DFG Views

The Department of Fish and Game has asserted that there is no proven vaccine to prevent rabies in ferrets.

Ferret Proponents’ Response

Proponents respond that a rabies vaccine (IMRAB-3) exists and meets standards for effectiveness.

Evidence and Discussion

Rhone Mirieux, the producer of the rabies vaccine IMRAB-3, has formally advised the Department of Fish and Game (by letter, April 6, 1994) that its vaccine exceeds U.S. Department of Agriculture requirements in ferrets, and has advised the department to cease claiming otherwise. It should be noted, however, that ferrets are typically sold at 6 to 7 weeks, but cannot be inoculated against rabies until 12 weeks. This puts the burden of assuring inoculation on the new pet owner. The same burden applies to those who acquire kittens and puppies, which are typically taken to a new home at about 8 weeks but not inoculated until age 4 months. Documented cases of rabies



in domestic ferrets appear to be extremely rare (only 21 documented from 1958 to 1996). This may in part be the result of domestic ferrets, unlike cats and dogs, being almost exclusively housebound. (They tend to wander away from home if left outside, and rarely find their way back.) Pet ferrets, therefore, are relatively unlikely to encounter a rabid animal from which they might acquire the disease. Statistics cited above appear to bear this out.

#### Conclusion

Rabies vaccination should be required for domestic ferrets, just as it is for domestic cats and dogs. Ferrets sold at or after 12 weeks of age should be vaccinated before sale. For those sold at the typical 6 to 7 weeks, it is vital that owners be advised of the requirement to have the animals vaccinated at 12 weeks.” (pages 3-4, Umbach 1997)

### 10.2.3. Reports from Agencies

Summary of the CSUS questionnaire is presented in the following table.

| Are there instances of domesticated ferrets attacking, biting, or otherwise hurting humans in your State? |                        |                                                                                                                          |         |            |                    |                                                                    |                       |                          |
|-----------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------|---------|------------|--------------------|--------------------------------------------------------------------|-----------------------|--------------------------|
|                                                                                                           | No                     | Don't know                                                                                                               | 1 to 10 | 10 to 100  | Est. 0 to 1 / year | Est. 1 to 10/year                                                  | Est. 10 to 100 / year | Est. 100 to 1,000 / year |
| Response of States & Provinces                                                                            | IN, KY, MA, NB, OR, WV | AR, AZ(2), BC(2), CA, DE, DE, HI, ID, IL, KY, LA, MN, MO, NE, NH, NJ, NM, NS, NV, NY, OK(2), PA, TN, WA, WA, WA, WI, WY, | SD, WY  | AL, GA, OH | ND, VT             | AK, AR, CO, CT(2), DC, IA, KS, ME, MN, MT, ND, NY, RI, SC, SD, WA, | IA, MD, MI, VI, WI    | MN, NJ                   |

Respondents provided some additional information, reproduced here:

- Georgia Department of Health personnel responded that there were 43 instances since 2003.
- Dr. Dee Jones (Associate State Public Health Vet., Alabama Dept. of Public Health) responded: “Yes. There are 10-20 instances per year.” Dr. Jones also noted that since 2009, Alabama State required that all ferrets be vaccinated.
- Dr. Kathleen A Smith (Ohio Department of Health) reported 16 cases since 2008.
- Sue Coffee (a detective with the Carson City Sheriff's Department) investigated the Michelle Bower mauling case. She later spearheaded legislation to outlaw ferrets in Carson City and state-wide in Nevada (Hitchcock 1995).

California Department of Health Services did not respond to the CSUS questionnaire. In 1988, California Department of Health Services estimated that the rate of ferret attacks in California were 1 attack per 1 million human residents per year.

### 10.2.4. Potential Mitigation Measures

Serious ferret attacks appear to be rare and to be confined to those humans that cannot defend themselves against a small animal, which for the most part, consists of infants and small children, but may also include the elderly and the handicapped. Regardless of their rarity, ferret attacks may contribute a potentially significant cumulative impact upon human health. Following is a discussion of potential mitigation measures.

Humane Society of the United States (HSUS) recommends the following on their Internet site about ferrets:

“Don't shop: Adopt

The HSUS believes that ferrets, like other companion animals, should not be bred for commercial purposes or sold in retail pet stores. If you are thinking of adding a ferret to your family, see if an animal shelter or rescue group near you has any ferrets for adoption.

### Special considerations

Ferrets are very different from more traditional companion animals such as dogs and cats. They are marketed by the pet industry as "unusual," but individuals considering adopting a ferret should be wary of the industry's claims that unusual pets are easy to care for. Ferrets require a high level of commitment to be cared for responsibly and humanely; individuals not prepared or able to make such a commitment should not keep ferrets as pets.

### Responsible care

Ferrets have sharp teeth and occasionally bite when startled, excited, or handled improperly. There have even been incidents when small children have been seriously injured by ferret bites. Children, particularly infants, should never be left unsupervised with ferrets (or with any other companion animal). Like all mammals, ferrets can carry and transmit rabies. Therefore, all ferrets should be vaccinated against this fatal viral disease.

### Sterilization

Pet ferrets must be spayed or neutered to prevent them from adding to the numbers of unwanted and homeless ferrets in need of shelter and rescue. Sterilization is particularly important for female ferrets, who can contract a disease called fatal aplastic anemia." (HSUS 2010).

AVMA recommends caution when bringing a pet ferret into a house with small children (American Veterinary Medical Association 2010). Most pet manuals state that young children should not be left unsupervised with a ferret (e.g. Morton and Morton 1995). *Ferrets for Dummies* warns not to leave ferrets, or any pets, with unsupervised infants or incapacitated people; advice is given on how to train a child to interact with a ferret (Schilling 2007). A more conservative measure would be to not allow a ferret near infants (or elderly or handicapped) at any time.

Mandatory warning labels could accompany ferrets offered for sale. The South Carolina Code of Law provides an example of a mandatory warning label:

#### South Carolina Code of Law

#### Title 47 - Animals, Livestock and Poultry

#### CHAPTER 5. RABIES CONTROL

##### SECTION 47-5-50. Prohibition on sale of wild carnivores as pets; sale of domesticated ferrets.

(A) No carnivores, which normally are not domesticated, may be sold as pets in this State. A carnivore kept by an individual must not be allowed to run at large and then returned to confinement. A normally wild animal indigenous to this State, if held captive for a period of time, may be released to the wild. This section does not apply to domesticated ferrets. However, no ferret may be sold in this State without proper and current vaccination against rabies. Evidence of rabies vaccination is a certificate signed by a licensed veterinarian. A person who purchases or possesses a domesticated ferret shall maintain proper vaccination treatment for it annually.

(B) Purchasers of a domesticated ferret must be provided with a notice not less than eight inches by eleven inches which shall bear the following inscription in letters not less than three-fourths inch high:

"FERRETS HAVE A PROPENSITY TO MAKE UNPROVOKED ATTACKS THAT CAUSE BODILY INJURY TO A HUMAN BEING".

(C) Each business establishment in this State, to which has been issued a retail sales tax license, which offers ferrets for sale must prominently display a notice not less than eight inches by eleven inches which shall bear the following inscription in letters not less than three-fourths inch high:

"FERRETS HAVE A PROPENSITY TO MAKE UNPROVOKED ATTACKS THAT CAUSE BODILY INJURY TO A HUMAN BEING".

(Available on the Internet at: <http://www.scstatehouse.gov/CODE/t47c005.htm>)

Similar to other individual cases of dangerous pets or wildlife, euthanization could be required for ferrets that have shown a propensity to cause serious harm to any person.

### **10.2.5. Summary and Opinion**

Ferrets have a propensity to bite, and for various reasons. The frequency of ferret bites has not been demonstrated to be greater than the rates for dogs or cats, whose bite frequencies are considered to be acceptable risks that are outweighed by the benefits of their companionship. Serious ferret attacks appear to be rare and to be confined to infants and others who cannot defend themselves against a small animal. In most cases of serious attacks, the pet owners were not aware of the risks of leaving an unattended child near a ferret. Mitigation measures might include mandatory warning labels at points of sale, public outreach, and more radically, the ban of ferrets from homes with infants, elderly, or handicapped, and the euthanization of ferrets proven to cause serious injury. The CSUS questionnaire of health departments in the USA has not revealed any major opposition to ferret ownership; where agency personnel did comment, their concern focused on infants left unsupervised with ferrets. Provided that effective mitigation measures are incorporated into a legalization action, this potential impact upon human health could be reduced to a less-than significant level. This issue may not need to be analyzed further in the EIR.

## ACKNOWLEDGEMENTS

CSUS Department of Biological Sciences students Navneet Shah and Angela de Palma-Dow served as research assistants on this study, and they were instrumental in the timely completion of both the literature review and the agency questionnaire. We would like to thank Minnie Chabot (Grant Administration Officer, University Enterprises Inc.) for administration of this research grant. We are indebted to Jack Smith and Astra Gleason (Interlibrary Services, CSUS Library) for the search and acquisition of numerous obscure texts. We are also indebted to the many agency personnel who responded to data requests and to the questionnaire.

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## APPENDICES



## **APPENDIX A: SAMPLE QUESTIONNAIRE**



# CALIFORNIA STATE UNIVERSITY, SACRAMENTO

DEPARTMENT OF BIOLOGICAL SCIENCES

## DOMESTICATED FERRET QUESTIONNAIRE

### Ferret Survey of North American Governmental Agencies

#### Instructions:

Please answer this questionnaire to the best of your ability. If certain questions do not apply to your agency, leave blank, or ideally, forward those questions to the appropriate agency personnel in your State. Please provide supporting documentation for your responses; we can reimburse you for expenses incurred for reproduction or shipment. While this study is focused on the domesticated European ferret (*Mustela putorius furo*), we are also interested in any information about the wild European polecat/steppe polecat (*M. putorius* or *M. eversmanni*) that may exist in your State. We do not need information on the black-footed ferret (*M. nigripes*) unless there are interactions with domesticated ferrets. If you have any questions, please contact Dr. G.O. Graening by phone (916.452.5442) or email ([graening@csus.edu](mailto:graening@csus.edu)). Results will be published in a peer-reviewed journal.

Responder's Name and Title: \_\_\_\_\_

Agency Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Email: \_\_\_\_\_

Phone: \_\_\_\_\_

## HISTORY OF THE DOMESTICATED FERRET

☐ The domesticated ferret was first introduced / imported into my State in year: \_\_\_\_\_

☐ Don't know exactly, but my professional estimate is in year: \_\_\_\_\_

☐ Domesticated ferrets are not known to exist in my State.

#### When did your State begin to regulate importation or possession of domesticated ferrets?

☐ Domesticated ferret importation and/or possession was first regulated in my State in year: \_\_\_\_\_

☐ Domesticated ferret importation and/or possession has never been regulated by my State

## NOMENCLATURE AND CLASSIFICATION

#### Which of these terms are used in your State to refer to the domesticated ferret (*Mustela putorius furo*)?

☐ Ferret ☐ Fitch ☐ Polecat ☐ Polecat / ferret hybrid

☐ English ferret ☐ European ferret ☐ *Mustela furo* ☐ *Mustela putorius furo*

☐ Other: \_\_\_\_\_

#### Which of these terms are used in your State to classify domesticated ferrets under any regulations or codes?

☐ Pet ☐ Nongame animal ☐ Domestic animal ☐ Wild animal / Wildlife

☐ Exotic animal ☐ Nuisance animal ☐ Furbearer ☐ Restricted animal

☐ Other: \_\_\_\_\_

(Please provide wildlife code, statute, ordinance, or other source documentation)

6000 J Street, Sacramento, California 95819-6077 • (916) 278-6535 • (916) 278-6993 FAX

## NUMBER OF DOMESTICATED FERRETS IN YOUR STATE

**Please estimate the total number of domesticated ferrets in your State:**

☐ An estimated \_\_\_\_\_ domesticated ferrets exist in my State *(Please provide your source, rationale, or supporting documentation)*

If sufficient data exists to separate this estimate into use categories, please fill out the following table:

|                | Legally Possessed | Illegally Possessed |
|----------------|-------------------|---------------------|
| TOTAL          |                   |                     |
| Pets           |                   |                     |
| Lab animal     |                   |                     |
| Hunting aid    |                   |                     |
| Fur production |                   |                     |

☐ Can't say precisely, but my professional estimate of the range of domesticated ferrets that exist in my State is:

☐ 1 to 1,000 ferrets    ☐ 1,000 to 10,000    ☐ 10,000 to 100,000    ☐ greater than 100,000

## REGULATION OF DOMESTICATED FERRETS

**Is the importation or possession of domesticated ferrets regulated in your State?** ☐ No    ☐ Yes

If yes, please list the agency (or agencies) that have authority for making regulations regarding the importation and possession of domesticated ferrets in your State: \_\_\_\_\_

*(For example, the legislature, a state agriculture agency, health agency, wildlife/natural resources agency, etc.)*

**Are you aware of any local government agencies in your State that have adopted ordinances prohibiting ownership of domesticated ferrets?** ☐ No    ☐ Yes    If yes, please specify: \_\_\_\_\_

**Which entity has authority for issuing permits to possess domesticated ferrets for the following activities?**

|                                         | Importation              | Sport Hunting            | Farm Pest Control        | Lab animal               | Pet                      | Breeding                 | Zoo                      | Fur Production           |
|-----------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| State wildlife/natural resources agency | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| State agriculture agency                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| State health agency                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Local governments                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other entity: _____                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Activity does not require a permit      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Was an environmental impact statement, or other environmental assessment or written evaluation, prepared for legalizing domesticated ferret ownership in your state?** ☐ No    ☐ Yes *(Please cite or attach a copy)*

**Do you have state regulations that clearly prohibit the release of domesticated ferrets from captivity?**

☐ No    ☐ Yes    If yes, please cite the code number *(or attach a copy of the regulation)*: \_\_\_\_\_

**Does your State allow captive breeding of domesticated ferrets?**

☐ No      ☐ Yes      If yes, please indicate which breeding categories are allowed:

| Captive breeding category          | State permit required    | Local permit required    | No permit required       |
|------------------------------------|--------------------------|--------------------------|--------------------------|
| Breeding for pet trade             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Breeding for research laboratories | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Breeding for fur market            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Breeding for hunting (ferreting)   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**DOMESTICATED FERRETS AND AGRICULTURE ISSUES****Are there instances of domesticated ferrets killing or otherwise harassing livestock in your State?**

- ☐ No  
☐ Don't know  
☐ Don't know exactly, but my professional estimate is:
- ☐ 0 to 1 instances per year      ☐ 1 to 10 / year      ☐ 10 to 100 / year      ☐ greater than 100 / year
- ☐ Yes. There are \_\_\_\_\_ instances per year  
☐ Yes. There are \_\_\_\_\_ instances over the time period of record keeping. Records have been kept since year: \_\_\_\_\_  
*(Please cite data source or provide supporting documentation)*

**Are there instances of domesticated ferrets killing or harassing wildlife in your State?**

- ☐ No  
☐ Don't know  
☐ Don't know exactly, but my professional estimate is:
- ☐ 0 to 1 instances per year      ☐ 1 to 10 / year      ☐ 10 to 100 / year      ☐ greater than 100 / year
- ☐ Yes. There are \_\_\_\_\_ instances per year  
☐ Yes. There are \_\_\_\_\_ instances over the time period of record keeping. Records have been kept since year: \_\_\_\_\_  
*(Please cite data source or provide supporting documentation)*

**DOMESTICATED FERRETS AND HUMAN HEALTH ISSUES****Are there instances of domesticated ferrets attacking, biting, or otherwise hurting humans in your State?**

- ☐ No  
☐ Don't know  
☐ Don't know exactly, but my professional estimate is:
- ☐ 0 to 1 instances per year      ☐ 1 to 10 / year      ☐ 10 to 100 / year      ☐ greater than 100 / year
- ☐ Yes. There are \_\_\_\_\_ instances per year  
☐ Yes. There are \_\_\_\_\_ instances over the time period of record keeping. Records have been kept since year: \_\_\_\_\_  
*(Please cite data source or provide supporting documentation)*

**Are there instances of domesticated ferrets contracting rabies (*Lyssavirus*) in your State?**

- ☐ No  
☐ Don't know  
☐ Don't know exactly, but my professional estimate is:  
     ☐ 0 to 1 instances per year      ☐ 1 to 10 / year      ☐ 10 to 100 / year      ☐ greater than 100 / year
- ☐ Yes. There are \_\_\_\_ instances per year  
☐ Yes. There are \_\_\_\_ instances over the time period of record keeping. Records have been kept since year: \_\_\_\_  
 (Please cite data source or provide supporting documentation)  
 If yes, please indicate how many of these instances resulted in ferrets transmitting the rabies virus to humans: \_\_\_\_  
 (Please cite data source or provide supporting documentation)

**NUMBER OF DOMESTICATED FERRETS ABANDONED, STRAY, ESCAPED, OR FERAL / IN THE WILD****Are there abandoned, stray, or otherwise unconfined domesticated ferrets in your State?**

- ☐ No  
☐ Don't know  
☐ Don't know exactly, but my professional estimate is:  
     ☐ 0 to 1 ferrets      ☐ 1 to 10 ferrets      ☐ 10 to 100 ferrets      ☐ greater than 100 ferrets
- ☐ Yes. There are \_\_\_\_ unconfined domesticated ferrets known in my State over the time period of record keeping.  
 Records have been kept since year: \_\_\_\_  
 (Please cite data source or provide supporting documentation)

**Have any unconfined domesticated ferrets established a (feral) breeding population in your State?**

- ☐ No, or probably not  
☐ Don't know  
☐ Don't know exactly, but my professional estimate is:  
     ☐ 0 to 1 feral populations      ☐ 1 to 10 populations      ☐ 10 to 100 populations      ☐ greater than 100 populations
- ☐ Yes. There are \_\_\_\_ feral breeding populations known in my State over the time period of record keeping.  
 Records have been kept since year: \_\_\_\_  
 (Please cite data source or provide supporting documentation)

**Has your State made any effort to assess the status of domesticated ferrets in the wild/feral/outside of captivity?**

- ☐ No, not considered to be important  
☐ No, but desirable. Please comment: \_\_\_\_  
☐ Yes. If yes, indicate how this effort is made: \_\_\_\_  
 (e.g., opportunistically document, thoroughly check out all reports, routinely check during field studies, intensive surveys)

## CONTROL OF DOMESTICATED FERRETS THAT ARE ABANDONED, STRAY, FERAL, OR UNCONFINED

**What action would be taken by your agency upon discovery of an abandoned, escaped, feral, or otherwise unconfined domesticated ferret?**

- ☐ No action would be taken  
☐ Defer to local government management decision  
☐ Live trap and take to animal shelter (presumed lost pet)  
☐ Live trap and euthanize  
☐ Take by any means  
☐ Other action: \_\_\_\_\_

**What action would your agency take upon discovery of an established (feral) breeding population of domesticated ferrets?**

- ☐ No action would be taken  
☐ Defer to local government management decision  
☐ Remove / eradicate population  
☐ Other action: \_\_\_\_\_  
☐ If not applicable to your agency, please indicate which agency would act: \_\_\_\_\_

**Please mark which types of facilities may receive/handle abandoned, stray, escaped, or otherwise unconfined domesticated ferrets:**

| Type of Facility                    | Permit required          | No permit required       |
|-------------------------------------|--------------------------|--------------------------|
| Private ferret shelters             | <input type="checkbox"/> | <input type="checkbox"/> |
| Humane society shelters             | <input type="checkbox"/> | <input type="checkbox"/> |
| Wildlife rehabilitation centers     | <input type="checkbox"/> | <input type="checkbox"/> |
| State wildlife agency facilities    | <input type="checkbox"/> | <input type="checkbox"/> |
| State agriculture agency facilities | <input type="checkbox"/> | <input type="checkbox"/> |
| State health agency facilities      | <input type="checkbox"/> | <input type="checkbox"/> |

Other: \_\_\_\_\_

Signature of Responder: \_\_\_\_\_

or check here for electronic signature: ☐

Date: \_\_\_\_\_

*Thank you very much for participating in this academic research.*

Please print, sign, and mail completed questionnaire to: Dr. G.O. Graening  
 CSUS Dept. of Biological Sciences  
 6000 J Street, Sacramento, CA 95819-6077

Or email to: [graening@csus.edu](mailto:graening@csus.edu)

6000 J Street, Sacramento, California 95819-6077 • (916) 278-6535 • (916) 278-6993 FAX



## **APPENDIX B: CORRESPONDENCE LOG OF NORTH AMERICAN GOVERNMENTAL AGENCIES**

# **Ferret Survey of North American Governmental Agencies Research Project**

## **CORRESPONDENCE LOG – USA AGENCIES**

### **ALABAMA**

Dept. of Conservation and Natural Resources

Enforcement division; 334.242.3467; [left message with Captain]

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Mark Sasser, coordinator, Nongame Wildlife Program, 334.242.3469, [mark.sasser@dcnr.alabama.gov](mailto:mark.sasser@dcnr.alabama.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.
- 19 March 2010: Sent initial request to participate and both versions of questionnaire to Wildlife and Fisheries Division (334) 242- 3465, [pam.thomas@dcnr.alabama.gov](mailto:pam.thomas@dcnr.alabama.gov) , 334-242-3465, It says online that
- 7 May 2010: Mark Sasser, Wildlife biologist completed phone survey. 334-242-3469.

Alabama Department of Agriculture & Industries

1445 Federal Drive, Montgomery, AL 36107

Commissioner Ron Sparks; 334.240.7100; [ron.sparks@agi.alabama.gov](mailto:ron.sparks@agi.alabama.gov)

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Animal Industry Division; Crystal Kennedy, [crystal.kennedy@agi.alabama.gov](mailto:crystal.kennedy@agi.alabama.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.

Alabama Department of Public Health

Donald E. Williamson, State Health Officer, 334.206.5200

P.O. Box 303017, Montgomery, AL 36130-3017

- 1 October 2009: Mailed hardcopy of questionnaire to: P.O. Box 303017, Montgomery, AL 36130-3017
- 16 October 2009: Called to follow up: Dr. De Jones State Veterinarian might have got it his phone number is 334-206-5971
- 30 October 2009: Called to follow up: Dr. De Jones said he filled and mailed us but since we didn't received till now, he wouldn't mind to do it again, emailed electronic version of questionnaire at [deejones@adph.state.al.us](mailto:deejones@adph.state.al.us)
- 16 November 2009: Dr. Dee Jones, Assoc. State Public Health Veterinarian, Alabama Dept. of Public Health, [deejones@adph.state.al.us](mailto:deejones@adph.state.al.us), submitted a completed questionnaire by FedEx

### **ALASKA**

Commission; 907.465.4100

Alaska Dept. of Fish and Game, Wildlife Div., PO Box 115525, Juno AK 99811-5526

17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to:

Tom Schumacher, Wildlife Div., [tom.schumacher@alaska.gov](mailto:tom.schumacher@alaska.gov) Wildlife conservation

25 September 2009: Tom Schumacher sent the completed questionnaire back via email.

ADNR Division of Agriculture

Director's Office, 1800 Glenn Highway, Suite 12, Palmer, Alaska 99645; 907-745-7200

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Franci Havemeister, Director, 907-761-3867, [Franci.Havemeister@alaska.gov](mailto:Franci.Havemeister@alaska.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.

Alaska Health and Social Services  
4431 North Franklin, Suite 200, Juneau AK 99801

- 30 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Sally Bowers, Executive Director, 907.451-2017, [sally.bowers@alaska.gov](mailto:sally.bowers@alaska.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.

## ARIZONA

Arizona Game and Fish Department  
602.942.3000 [Main line; dial 0 to bypass; can't get past recordings]

- 15 September 2009: Mailed hardcopy of questionnaire to: Arizona Game and Fish Department, 5000 W. Carefree Highway, Phoenix, AZ 85086-5000
- 15 October 2009: Called to follow up: left a message with research department
- 12 November 2009: Called to follow up: Goria (623-236-7506) in nongame department called back they have questionnaire and are working on it will send it back by due date
- 8 December 2009: Holly Hicks, Small Mammal Biologist, 623.236.7499, [hhicks@azgfd.gov](mailto:hhicks@azgfd.gov), submitted questionnaire responses by FedEx

Arizona State Department of Agriculture  
1688 West Adams Street, Phoenix, AZ 85007  
602.542-4373

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Office of the State Veterinarian, Jim Meggs, 602.542-0943, [jmeggs@azda.gov](mailto:jmeggs@azda.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.
- 31 March 2010: Sent initial request to participate and questionnaire to State Veterinarian, Associate Director of Animal Services Division, 602-542-4293, [jhunt@azda.gov](mailto:jhunt@azda.gov)

Arizona Department of Health Services  
January Contreras, Acting Director, 602.542-1025  
Directors Office: 150 North 18th Avenue, Phoenix, AZ 85007

- 1 October 2009: Mailed hardcopy of questionnaire to: 150 North 18th Avenue, Phoenix, AZ 85007
- 16 October 2009: Called to follow up: (couldn't pass the recording)
- 12 November 2009: Called to follow up: left a message

## ARKANSAS

Arkansas Game and Fish Commission

- 23 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Blake Sasse, State Mammalogist: [dbsasse@agfc.state.ar.us](mailto:dbsasse@agfc.state.ar.us)
- 27 October 2009: Blake Sasse said the questionnaire was in the mail

- 4 November 2009: Blake Sasse, Nongame Mammal Program Coordinator, Arkansas Game and Fish Commission, [dbsassse@agfc.ar.us](mailto:dbsassse@agfc.ar.us), 501.470.3650, mailed hardcopy responses to questionnaire.

Arkansas Livestock and Poultry Commission  
1 Natural Resources Drive Little Rock, AR 72205  
501-683-4851

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Richard Bell, Secretary of the Agriculture Department, [secretary@aad.ar.gov](mailto:secretary@aad.ar.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 19 November 2009: questionnaire emailed to Dr. George (Pat) Badley, AR State Veterinarian, [pbadley@alpc.ar.gov](mailto:pbadley@alpc.ar.gov), 501.907.2400.
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.
- 31 March 2010: Received hardcopy response from Pat Bradley, livestock and poultry division.

Arkansas Department of Health  
4815 West Markham St., Slot 39, Little Rock, AR 72205  
501-661-2400

- 30 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Paul K. Halverson, Director State Health Officer, [phalverson@healthyarkansas.com](mailto:phalverson@healthyarkansas.com)
- 4 October 2009: email address was rejected
- 20 October 2009: Mailed hardcopy of questionnaire to: 4815 West Markham St., Slot 39, Little Rock, AR 72205
- 12 November 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dr Susan Weinstein phone number 501-280-4136 [susan.weinstein@arkansas.gov](mailto:susan.weinstein@arkansas.gov)
- 13 November 2009: Dr. Susan Weinstein, State Public Health Veterinarian (Arkansas Department of Health, 501.280.4136, [Susan.Weinstein@arkansas.gov](mailto:Susan.Weinstein@arkansas.gov)) submitted by email partial responses to the questionnaire as an MS Word document form

## CALIFORNIA

Department of Fish and Game

- 16 September 2009: Mailed hardcopy of questionnaire to: Department of Fish and Game, 1416 9th Street, Sacramento, CA 95814
- 15 October 2009: the Non-game division requested electronic versions to send to Enforcement and Licensing; electronic versions were emailed on this day

California Department of Food and Agriculture  
1220 N Street, Sacramento, CA 95814

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: State Veterinarian, Richard Breitmeyer, DVM, 916-651-6870, [rbreitmeyer@cdfa.ca.gov](mailto:rbreitmeyer@cdfa.ca.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 30 November 2009: Dr. Kent Fowler, 916.657.5041, [kfowler@cdfa.ca.gov](mailto:kfowler@cdfa.ca.gov), submitted questionnaire responses by regular mail

California Department of Public Health

- 30 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dr. Mark B. Horton, Director, 916.558.1700, [mark.horton@cdph.ca.gov](mailto:mark.horton@cdph.ca.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.

## COLORADO

Colorado Division of Wildlife Main

Wildlife conservation: 303.291.7336

- 15 September 2009: Mailed hardcopy of questionnaire to: Colorado Division of Wildlife, 6060 Broadway, Denver, Colorado, 80216
- 15 October 2009: Called to follow up: left message
- 20 October 2009: emailed questionnaire to Eric O'Dell, [eric.odell@state.co.us](mailto:eric.odell@state.co.us), 970-472-4340, 4300
- 22 October 2009: Mr. Odell emailed a response, asking why he received a ferret questionnaire from SeaSearch as well; Dr. Graening responded as best he could
- 21 December 2009: left message
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.
- 7 May 2010: Called Conservation of wildlife division, got referred to both Fort Collins Terrestrial Wildlife Biologist, Eric Odell, 970-472-4340, [Eric.odell@state.co.us](mailto:Eric.odell@state.co.us) and Furbearer specialist Jerry Apker 719-587-6922 [Jerry.Apker@state.co.us](mailto:Jerry.Apker@state.co.us). Left Jerry a message.

Colorado Department of Agriculture

Division of Animal Industry

710 Kipling St., Ste. 202, Lakewood, CO 80215-8000

303-239-4161

- 5 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Keith Roehr, DVM, State Veterinarian, [keith.roehr@ag.state.co.us](mailto:keith.roehr@ag.state.co.us)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 21 December 2009: E-mailed questionnaire again to Keith Roehr, DVM, State Veterinarian, [keith.roehr@ag.state.co.us](mailto:keith.roehr@ag.state.co.us)
- 14 January 2010: Nick J. Striegel [nick.striegel@ag.state.co.us](mailto:nick.striegel@ag.state.co.us) DVM Colorado Assistant State Veterinarian submitted questionnaire responses by email

Colorado Department of Public Health and Environment, 303.692.2000

4300 Cherry Creek Drive South, Denver, Colorado 80246-1530

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [cdphe.information@state.co.us](mailto:cdphe.information@state.co.us)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 28 October 2009: Got email response from Maria S. Zepeda-Sanchez, [maria.zepeda@state.co.us](mailto:maria.zepeda@state.co.us), said have no idea who we might have send questionnaire to at health department. However, need to resend to the Colorado Division of Wildlife at the Colorado Department of Natural Resources
- need to follow up

## CONNECTICUT

Department of Environmental Protection

Division of Wildlife; HQ, 860.295.9523 [friendly but don't know]

Non-game program (Sessions Wood office) 860.675.8130; says their program can't help; says there are no ferrets in State/not regulated;

Hartford; Laurie Fortin, 860.424.3011; [left message on general office line]

- 15 September 2009: Mailed hardcopy of questionnaire to: Connecticut Department of Environmental Protection, 79 Elm Street, Hartford, CT 06106-5127
- 15 October 2009: Called to follow up: Lady said they don't recall getting it
- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dept. of Env. Protection, Division of Wildlife, [dep.wildlife@ct.gov](mailto:dep.wildlife@ct.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 21 December 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Elaine Hinsch at [Elaine.hinsch@ct.gov](mailto:Elaine.hinsch@ct.gov)
- 19 February 2010: E-mailed to follow up and check if agency received
- 26 February 2010: Received email from Lance Darrick Hansen DEP-Wildlife Division, [lance.hansen@ct.gov](mailto:lance.hansen@ct.gov), sent recommendation on who to contact, see Department of Agriculture below.

#### Department of Agriculture

165 Capitol Avenue, Hartford, CT 06106, 860-713-2569, 860-713-2564

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [ctdeptag@ct.gov](mailto:ctdeptag@ct.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 26 February 2010: Sent initial request of questionnaire to Denise Alix, Conn Department of agriculture.
- [denise.alix@ct.gov](mailto:denise.alix@ct.gov), 860-713-2506, as per recommendation of Lance Darrick Hansen Connecticut DEP-Wildlife Division
- 5 March 2010: Sent questionnaire request to St. Veterinarian Mary Lis, with Bureau of Regulation and Inspection, [mary.lis@ct.gov](mailto:mary.lis@ct.gov), 860-713-2505
- 12 March 2010: Left message on Mary Lis voice mail regarding availability to complete the survey.
- 19 March 2010: Called Mary Lis, she opened up questionnaire and briefly answered some questions regarding rabies vaccine and ferrets, and she will fill out questionnaire and send back to me.
- 26 March 2010: Dr. Lis responded a partially completed response. She recommended Elaine Hinsch or Laurie Fortin at CT Dept of Environmental Protection, Wildlife Division.

#### Connecticut Department of Public Health

Commissioner J. Robert Galvin,  
410 Capitol Avenue, Hartford, CT 06134  
860.509-7101

- 1 October 2009: Mailed hardcopy of questionnaire to: 410 Capitol Avenue, Hartford, CT 06134
- 16 October 2009: Called to follow up: Lady said somebody from their agency looked at it and suggested that agriculture department can answer it in a better way so they send it over to them
- 21 December 2009: Called they send questions to department of agriculture Commissioners office J. Philips Prelli
- 21 December 2009: Called Commissioners office and left a message to call Dr. Graening.
- 19 March 2010: Called Office of Ag Commisioner, spoke with his secretary and she suggested Animal Control supervisor would be the best one to contact, Raymond Connors
- 19 March 2010: Sent initial request to participate and both versions of questionnaire to Raymond Connors, [Raymond.connors@ct.gov](mailto:Raymond.connors@ct.gov).
- 26 March 2010: Received completed questionnaire response from Raymond Connors, animal control supervisor.

#### DELEWARE

Dept. of Natural Resources and Env. Control

Public Affairs Section, 302.739.9902 [left message]

Division of Fish and Wildlife 302.739.9910; Director Patrick Emory: [patrick.emory@state.de.us](mailto:patrick.emory@state.de.us)



- 15 September 2009: Mailed hardcopy of questionnaire to: Delaware Division of Fish and Wildlife, 89 Kings Highway, Dover, DE 19901
- 13 October 2009: Called to follow up: Kareen from wildlife Division said they received it, but was not sure who was it handed over too. And the person she thought might got it was not in office, so she gave her own number that is 302-739-9912, so that we can call her later sometime this week and she will tract down who got the questionnaire.
- 15 October 2009: Joe Rogerson, Game Mammal Biologist, mailed hardcopy responses by FedEx

#### Department of Agriculture

2320 South DuPont Highway, Dover, Delaware 19901

Office of the Secretary, Secretary Ed Kee, 302.698-4500

- 1 October 2009: Mailed hardcopy of questionnaire to: 2320 South DuPont Highway, Dover, Delaware 19901
- 16 October 2009: Called to follow up: left a message
- 4 November 2009: Dr. Heather Hirst, State Veterinarian, Delaware Dept. of Agriculture, 302.632.7105, [heather.hirst@state.de.us](mailto:heather.hirst@state.de.us), mailed hardcopy responses to questionnaire.

#### Delaware Health and Social Services

Karyl Thomas Rattay, Director

417 Federal Street, Jesse Cooper Building, Dover, DE 19901

302.744-4700

- 1 October 2009: Mailed hardcopy of questionnaire to: 417 Federal Street, Jesse Cooper Building, Dover, DE 19901
- 16 October 2009: Called to follow up: left message at rabies department

## FLORIDA

#### Fish and Wildlife Commission

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Kurt Hodges, 850.627.1773 x 102, [kurt.hodges@myfwc.com](mailto:kurt.hodges@myfwc.com)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 21 December 2009: Called to follow up He said couldn't answer the questions since they are common pet but don't pose any kind of threat
- 21 December 2009: Called back left message if he can provide the above statement in written
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 4 March 2010: Kurt Hodges emailed response that he had already said he couldn't help with the questionnaire.

#### Florida Department of Agriculture and Consumer Services

The Capitol, Tallahassee, FL 32399-0800; 850.488.3022

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [commissioner@doacs.state.fl.us](mailto:commissioner@doacs.state.fl.us)
- 19 October 2009: E-mailed to follow up and check if agencies received questionnaire
- 21 December 2009: Called to follow up talked to lady she said they do not deal with it should contact USD united states department 352-313-3060
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 5 March 2010: Emailed questionnaire and request to Dr. Thomas Holt, State Veterinarian with division of animal industry, [holtt@doacs.state.fl.us](mailto:holtt@doacs.state.fl.us), 850-410-0900. Florida Department of Health
- 12 March 2010: Talked to Dr. Holts' secretary, she will check with his assistant and call me back.
- 12 March 2010: Dr. Holt called back, referred me to Danielle Stanek ([Danielle\\_stanek@doh.state.fl.us](mailto:Danielle_stanek@doh.state.fl.us)).

He said that he has not had ANY cases of domestic ferret (or wild ferret) harassing or attacking wildlife, poultry, or livestock in the entirety of his career with FL Ag commission.

Deputy State Health Officer  
2585 Merchants Row Boulevard, Tallahassee, FL 32399  
850 -245-4321

- 1 October 2009: Mailed hardcopy of questionnaire to: 2585 Merchants Row Boulevard, Tallahassee, FL 32399
- 16 October 2009: Called to follow up: left a message
- 30 October 2009: Called to follow up: No body received hardcopy, but Dr. Carina Blackmore can fill the questionnaire, emailed electronic version of questionnaire at [carina\\_blackmore@doh.state.fl.us](mailto:carina_blackmore@doh.state.fl.us)
- 21 December 2009: Left message for Dr. Carina Blackmore, 850-245-4732
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 12 March 2010: Sent initial request to participate and questionnaire to Danielle Stanek, as per recommendation of Dr. Thomas Holt.

## GEORGIA

DNR Wildlife Resources Division 770.918.6400

Game Management Section; 770.918.6416 [receptionist says state does not regulate domestic ferret; doesn't know anyone in Dept.]

- 15 September 2009: Mailed hardcopy of questionnaire to: Georgia Wildlife Resources Division, 2070 U.S. Hwy. 278, SE, Social Circle, GA 30025
- 13 October 2009: Called to follow up: Called the number above then give me Head quarters number that is 770-918-6404, she gave me other number 770-761-3044 which went to voice mail and left message.
- 30 October 2009: called to follow up: don't recall getting it and lady said agriculture department deals with it and it is allowed as pet if vaccine and fixed (27 5 5 REGULATION CODE)
- 19 March 2010: Received completed questionnaire from Todd N. Nims, Wildlife Biologist - Special Permit Unit Georgia Wildlife Resources Division. The questionnaire was completed with collaboration of Wildlife Resource Division AND Dept. of Agriculture division of Animal Protection.

Dept. of Agriculture  
Animal Industry, 404.656.3671  
19 Martin Luther King, Jr. Dr., S.W., Atlanta, Georgia 30334

- 5 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dr. C. Carter Black, III, State Veterinarian & Asst. Commissioner, [cblack@agr.state.ga.us](mailto:cblack@agr.state.ga.us), 404-656-3671
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 21 December 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dr. C. Carter Black, III, State Veterinarian & Asst. Commissioner, [cblack@agr.state.ga.us](mailto:cblack@agr.state.ga.us)
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 26 February 2010: E-mailed request and questionnaire to Dr. C. Carter Black, III, State Veterinarian & Asst. Commissioner, [cblack@agr.state.ga.us](mailto:cblack@agr.state.ga.us) AND the animal protection division Animal Protection
- Mary Greene, Ag. Mgr. III, Tele: (404) 656-4914, Fax: (404) 463-8195, Animal Protection [Administration@agr.state.ga.us](mailto:Administration@agr.state.ga.us)
- 5 March 2010: Received response from Mary Green [Mary.Greene@agr.georgia.gov](mailto:Mary.Greene@agr.georgia.gov), that her division, Animal Protection and Equine Health Division and the Dept. of Natural Resources would be working on survey and submitting it together.
- 19 March 2010: Received completed questionnaire from Todd N. Nims, Wildlife Biologist - Special Permit Unit Georgia Wildlife Resources Division. The questionnaire was completed with collaboration of Wildlife Resource Division AND Dept. of Agriculture division of Animal Protection.

Georgia Department of Community Health Division of public Health  
Rhonda M. Medows, Director

2 Peachtree Street, NW, Atlanta, GA 30303-3186  
404.657-2700

- 1 October 2009: Mailed hardcopy of questionnaire to: 2 Peachtree Street, NW, Atlanta, GA 30303-3186
- 16 October 2009: Called to follow up: Director's Secretary don't recall getting it but gave me some department numbers which might be able to answer our questions: veterinarian 478-207-2440, main Georgia operator 1800-GEORGIA, Epidemiology 404-657-2588 when I called this number lady said the right person is Madhavi Vajani 404-657-6440 [mavajani@dhrr.state.ga.us](mailto:mavajani@dhrr.state.ga.us)
- 19 October 2009: E-mailed to follow up and check if person received questionnaire
- 12 November 2009: E-mailed electronic version of questionnaire to: Madhavi Vajani [mavajani@dhrr.state.ga.us](mailto:mavajani@dhrr.state.ga.us)
- 21 December 2009: Called to follow up: Talked to Madhavi Vajani she referred to Malisa Halls 404-463-5117 [mlhall1@dhrr.state.ga.us](mailto:mlhall1@dhrr.state.ga.us), Malisa Halls would answer the questions
- 21 December 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Malisa Halls [mlhall1@dhrr.state.ga.us](mailto:mlhall1@dhrr.state.ga.us)
- 21 December 2009: Got an email response from Malisa Halls she received it and will send back response by deadline
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 5 March 2010: Called Melissa Halls 404-463-5117 and inquired about status of questionnaire, she said she forwarded the questionnaire to someone in the Department of Agriculture. I sent her a 'reminder' email asking who it was and which exact department the questionnaire was sent to and their contact information.
- 5 March 2010: Melissa Hall replied to email requesting resend of questionnaire. Sent it.
- 19 March 2010: Re-sent initial request to participate and both versions of questionnaire to Dr. Robert Cobb, [Robert.Cobb@agr.georgia.gov](mailto:Robert.Cobb@agr.georgia.gov), (Dr. Cobb was forwarded the survey and info from Melissa Hall, above, on March 5, 2010)

## HAWAII

Dept. of Land and Natural Resources

Division of Forestry and Wildlife, 808.974.4221; [referred to biologist Joey Mellow [jmello@dofwha.org](mailto:jmello@dofwha.org); need to send him email]

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Division of Forestry and Wildlife, Jason Omick, 808.974.4221, [Jason.D.Omick@hawaii.gov](mailto:Jason.D.Omick@hawaii.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire

Hawai'i Department of Agriculture

1428 S. King Street, Honolulu, HI 96814; 808.973.9560

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [hdoa.info@hawaii.gov](mailto:hdoa.info@hawaii.gov)
- 16 October 2009: Keevin Minami, Land Vertebrates Specialist, Plant Quarantine Branch, [keevin.k.minami@hawaii.gov](mailto:keevin.k.minami@hawaii.gov), submitted a completed questionnaire as PDF by email

Hawai'i Department of Health

Chiyome Leinaala Fukino, Director

1250 Punchbowl Street, Honolulu, HI 9681; 808-586-4410

- 1 October 2009: Mailed hardcopy of questionnaire to: 1250 Punchbowl Street, Honolulu, HI 9681
- 16 October 2009: Called to follow up: Left a message at directors office

## IDAHO

Department of Fish and Game; customer service 208.334.3700 [can't get past recording]

- 15 September 2009: Mailed hardcopy of questionnaire to: Idaho Department of Fish and Game, 600 S. Walnut, Boise, ID 83712
- 15 October 2009: Called to follow up: left a message
- 27 October 2009: Mark Drew, Wildlife Veterinarian, [mark.drew@idfg.idaho.gov](mailto:mark.drew@idfg.idaho.gov), submitted hardcopy responses by FedEx

Idaho State Department of Agriculture

2270 Old Penitentiary Road, Boise, Idaho 83712; 208.332.8500

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [info@agri.idaho.gov](mailto:info@agri.idaho.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 19 March 2010: Sent initial request to participate and both versions of questionnaire to Debra Lawrence, DVM, Bureau of Animal Health & Livestock 332-8540 ( Vet Med Officer Sr., Brucellosis Epidemiologist) [debra.lawrence@agri.idaho.gov](mailto:debra.lawrence@agri.idaho.gov) and Marilyn Simunich, DVM - Section Manager, [marilyn.simunich@agri.idaho.gov](mailto:marilyn.simunich@agri.idaho.gov), Bureau of Animal Disease Surveillance & Diagnostics 332-8560 AND Rangeland Management Program Manager, Ron Kay, 332-8566, [ron.kay@agri.idaho.gov](mailto:ron.kay@agri.idaho.gov)

Idaho Department of Health and Welfare

Richard Armstrong, Director

450 W. State Street, 10th Fl., Boise, ID 83706-0036

208.334.5500

- 1 October 2009: Mailed hardcopy of questionnaire to: 450 W. State Street, 10th Fl., Boise, ID 83706-0036
- 16 October 2009: Called to follow up: Nancy at 208-334-6996 received it handed over to veterinarian Leslie Tengelsen [tengelse@dhw.idaho.gov](mailto:tengelse@dhw.idaho.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.
- 19 March 2010: Leslie Tengelsen, PhD, DVM, Office of Epidemiology and Food Protection, Idaho Department of Health and Welfare, responded stating she 'knows nothing about ferrets' and that the questionnaire was completed by State Wildlife Veterinarian. Which he did, look above.

## ILLINOIS

Department of Natural Resources

Public Service 217.782.7454 [left message, but prefer a more specific phone number]

(217) 782-6232

- 15 September 2009: Mailed hardcopy of questionnaire to: Illinois Dept. of Natural Resources, One Natural Resources Way, Springfield, IL 62702-1271
- 13 October 2009: Called to follow up: The above number is for magazine department and she transferred me to receptionist, who transferred me to wildlife agency but didn't give their number and nobody answered the phone there
- 30 October 2009: E-mailed to follow up: [dnr.wildlife@illinois.gov](mailto:dnr.wildlife@illinois.gov)
- 21 December 2009: Left a message
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 26 February 2010: E-mailed request and questionnaire to Dept. of Nat. Resources Wildlife Action Plan, sent request and questionnaire to contact person for Illinois wildlife action plan, [JamesRenn@illinois.gov](mailto:JamesRenn@illinois.gov)
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.
- 19 March 2010: Re sent initial request to participate and both versions of questionnaire to James Renn Corrected email: [james.renn@illinois.gov](mailto:james.renn@illinois.gov)
- 7 May 2010: Contacted James Renn by phone, was referred to Bob Bluett [Bob.bluett@illinois.gov](mailto:Bob.bluett@illinois.gov), 217-782-7580, wildlife biologist with specialization in amphibians, herps and mammals. Left a message on Bob's voicemail.

- 24 June 2010: Spoke with Bob Bluett; need a permit Class A or B breeder/commercial permit to breed or sell ferrets; otherwise not regulated; sent Mr. Bluett a questionnaire to fill out by email
- 1 July 2010: Received a completed questionnaire from Mr. Bluett by email

State of Illinois Department of Agriculture

P.O. Box 19281, State Fairgrounds, Springfield, IL 62794-9281; 217.782.2172

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Bureau of Public Information: [agr.pio@illinois.gov](mailto:agr.pio@illinois.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 20 October 2009: Got E-mail response: "We have not received it. It would come to this Division but I am unsure who would be assigned to it." Colleen M. O'Keefe, DVM, MS Division Manager, Division of Food Safety and Animal Protection, Illinois Department of Agriculture, State Fairgrounds, P.O. Box 19281, Springfield, IL 62794-9281, 217-557-4645, [colleen.okeefe@illinois.gov](mailto:colleen.okeefe@illinois.gov)
- 30 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Colleen M. O'Keefe, [colleen.okeefe@illinois.gov](mailto:colleen.okeefe@illinois.gov)
- 21 December 2009: Called Colleen M. O'Keefe and left message
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 5 March 2010: Called Dr. O'Keefe, she is out of office, secretary number, Wendy is 217-557-4645, instructed to call back. Called back, she recommended Mark Ernst, state Veterinarian be sent the questionnaire.
- 5 March 2010: Sent questionnaire to [mark.ernst@illinois.gov](mailto:mark.ernst@illinois.gov), Bureau of Animal Health, office # 217-782-4944.
- 3 April 2010: Called office, no answer.
- 9 April 2010: Called office again, Mark out of office, but spoke with his Administrative Assistant, Susan Botez she completed a phone survey. She recommended Animal Control also.

Illinois Department of Public Health

Damon T. Arnold, Director

535 West Jefferson Street, Springfield, Illinois 62761

217.782.4977

- 1 October 2009: Mailed hardcopy of questionnaire to: 535 West Jefferson Street, Springfield, Illinois 62761
- 16 October 2009: Called to follow up: 217-782-2016 Disease section lady at front desk said these two people might have got it both were not in office today, Dr. Connie Austin veterinarian [connie.austin@illinois.gov](mailto:connie.austin@illinois.gov), Pat Piercy [pat.piercy@illinois.gov](mailto:pat.piercy@illinois.gov)
- 19 October 2009: E-mailed to follow up and check if they received questionnaire
- 20 October 2009: Got E-mail response from Dr. Connie Austin: "This would be Dept Ag in Illinois."
- 21 December 2009: Called to follow up they said they don't deal with ferrets contact Agriculture department
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 19 February 2010: Connie Austin (Division of Infectious Disease) emailed response directing questionnaire to Dept. of Agriculture.
- 26 February 2010: Connie Austin [Connie.Austin@illinois.gov](mailto:Connie.Austin@illinois.gov) responded by email suggesting the questionnaire be sent to dept. of agriculture.

**INDIANA**

Dept. Natural Resources

Division of Fish and Wildlife

402 W. Washington Street, Room W273, Indianapolis, IN 46204

17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to:

P. Mayer, 260.468.2706, [pmayer@dnr.in.gov](mailto:pmayer@dnr.in.gov)

22 September 2009: Linnea Petercheff, Operations Staff Specialist, 317.233.6527, [lpetercheff@dnr.IN.gov](mailto:lpetercheff@dnr.IN.gov), submitted finished questionnaire by email to Dr. Graening.

Indiana State Department of Agriculture

101 W. Ohio Street, Suite 1200, Indianapolis, IN 46204; 317.232.8770

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [atandy@isda.in.gov](mailto:atandy@isda.in.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.
- 31 March 2010: Sent initial request to participate and questionnaire to Dr. Bret D. Marsh, State Veterinarian, Indiana board of Animal Health, 317-227-0300, [bmarsh@boah.in.gov](mailto:bmarsh@boah.in.gov).

Indiana State Department of Health

2 North Meridian Street, Indianapolis, IN 46204

- 30 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Judith A. Monroe, State Health Commissioner, 317.233.1325, [jmonroe@isdh.IN.gov](mailto:jmonroe@isdh.IN.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.

**IOWA**

Dept. Natural Resources

Wildlife Bureau: 515.281.5918: (recording only)

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dept. Natural Resources, Bernie Hoyer, 515.281.7247, [bernie.hoyer@dnr.iowa.gov](mailto:bernie.hoyer@dnr.iowa.gov), and Dale Garner, Wildlife Chief, [dale.garner@dnr.iowa.gov](mailto:dale.garner@dnr.iowa.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 21 December 2009: Called Left a message out office till December 28<sup>th</sup> need to call back then again
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 19 February 2010: Phone response from Ron Andrews 641 357-3517 requesting questionnaire be sent to [ron.andrews@dnr.iowa.gov](mailto:ron.andrews@dnr.iowa.gov), sent via email both Word and PDF versions.
- 5 March 2010: Received completed electronic response from Ron Andrews, Fur Resource Specialist, [Ron.Andrews@dnr.iowa.gov](mailto:Ron.Andrews@dnr.iowa.gov), to Dr. Graening.

Iowa Department of Agriculture and Land Stewardship

Wallace State Office Building, 502 E. 9th Street, Des Moines, IA 50319; 515.281.5321

Dr. David Schmitt, State Vet., 515.281.8601

- 1 October 2009: Mailed hardcopy of questionnaire to: Wallace State Office Building, 502 E. 9th Street, Des Moines, IA 50319
- 16 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [randy.wheeler@iowaagriculture.gov](mailto:randy.wheeler@iowaagriculture.gov) and [david.schmitt@iowaagriculture.gov](mailto:david.schmitt@iowaagriculture.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 21 December 2009: Not in office will be back tomorrow, call back tomorrow
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.



- 31 March 2010: Received completed electronic response from Randy Wheeler. In accompanying email, Wheeler specified that they have not received input from Dept. of Natural resources.

Iowa Department of Public Health  
 Thomas Newton, Director  
 Lucas State Ofc. Bldg, Des Moines, IA 50319-0075  
 515.281.7689

- 1 October 2009: Mailed hardcopy of questionnaire to: Lucas State Ofc. Bldg, Des Moines, IA 50319-0075
- 16 October 2009: Called to follow up: lady said to call back on Monday since Directors Secretary is not in office and they might know where they send it
- 30 October 2009: Called to follow up and left message as well as got Directors Secretary Ramona Cooper's email: [RCooper@idph.state.ia.us](mailto:RCooper@idph.state.ia.us)
- 30 October 2009: E-mailed to follow up at [RCooper@idph.state.ia.us](mailto:RCooper@idph.state.ia.us)
- 21 December 2009: Called to follow up Ramona Cooper's asked to send email version of questions, questions emailed to: Directors Secretary Ramona Cooper's email: [RCooper@idph.state.ia.us](mailto:RCooper@idph.state.ia.us)
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire.
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.

## KANSAS

Dept. of Wildlife and Parks: 785.296.2281; directed to Wildlife Division: 620.672.5911;

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Wildlife Division, 620.672.5911, [Tina.mcferrin@wp.state.ks.us](mailto:Tina.mcferrin@wp.state.ks.us)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 21 December 2009: Called to follow up talked to Tina she said she didn't get it would like to do it if send again, emailed questions to Tina at [Tina.mcferrin@wp.state.ks.us](mailto:Tina.mcferrin@wp.state.ks.us)
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.
- 31 March 2010: Resent request to participate and questionnaire to [Tina.mcferrin@wp.state.ks.us](mailto:Tina.mcferrin@wp.state.ks.us).
- 7 May 7, 2010: Left a message for Tina Mcferrin.
- 14 May 2010: Received completed phone survey from Ken Bronsen, Wildlife Diversity Coordinator Kansas Dept. of Wildlife and Parks.

Department of Agriculture  
 109 SW 9th St. Topeka, KS 66612; 785.296.3556

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [ksag@kda.ks.gov](mailto:ksag@kda.ks.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 21 December 2009: Called to follow up talked to Ginger 785-296-3902, she don't recall getting but referred to Animal health and said to call her back if they couldn't help
- 21 December 2009: Called Animal health 785-296-2326 left message
- 21 December 2009: Dr. Karen Travis, 785.296.0748, returned our phone call and stated she would respond to questionnaire as best she could, but that little data existed; questionnaire sent to her email address [ktravis@kahd.ks.gov](mailto:ktravis@kahd.ks.gov)
- 8 January 2010: Debra S. Duncan, Director [dduncan@kahd.ks.gov](mailto:dduncan@kahd.ks.gov) submitted finished questionnaire by email to Dr. Graening.

Kansas Dept. of Health & Environment

1000 west Jackson, Suite 300, Topeka, KS 66612

- 30 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dr. Jason Eberhart-Phillips, Director, 785.296.1086 [JEberhart-Phillips@kdheks.gov](mailto:JEberhart-Phillips@kdheks.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 21 December 2009: called to follow up lady got our info and said Dr. Jason Eberhart-Phillips will call back
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.

## KENTUCKY

Department of Fish and Wildlife Resources

800.858.1549: treated like dogs & cats, need rabies; Laura Patton, furbearer biology:

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Laura Patton, [laura.patton@ky.gov](mailto:laura.patton@ky.gov), and Chad Soard, Captive Wildlife Permitting, 502.564.3402, [chad.soard@ky.gov](mailto:chad.soard@ky.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.
- 9 April 2010: Received completed questionnaire response from Chad Soard, wildlife biologist.

Department of Agriculture

Office of State Veterinarian; 502.564.3956

- 5 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Robert C. Stout, DVM, Executive Director, [robert.stout@ky.gov](mailto:robert.stout@ky.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.
- 31 March 2010: Send initial request to participate and questionnaire to State Veterinarian, Dr. Robert Stout, Division of Animal Health, 502-564-3956, [Robert.stout@ky.gov](mailto:Robert.stout@ky.gov).

Kentucky Department for Public health

William D. Hacker, Commissioner

Cabinet for Health and Family Services Office of the Secretary

275 E. Main St., Frankfort, KY 40621

502.564.3796

- 1 October 2009: Mailed hardcopy of questionnaire to: 275 E. Main St., Frankfort, KY 40621
- 15 October 2009: John Poe, State Public Health Veter., Division of Epidemiology and Health Planning, sent hardcopy responses by FedEx

## LOUISIANA

Department of Wildlife and Fisheries: 225.765.2800

Fur and Refuge Section

Wildlife Division Chief, J. Langlois: [janglois@wlf.la.gov](mailto:janglois@wlf.la.gov)

- 15 September 2009: Mailed hardcopy of questionnaire to: Louisiana Department of Wildlife and Fisheries, attn: Carrie Salyers, PO Box 98000, Baton Rouge LA 70898-9000
- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Carrie Salyers, [csalyers@wlf.la.gov](mailto:csalyers@wlf.la.gov)
- 15 October 2009: Called to follow up: she has moved to some other department, her email address is [csalyers@wlf.la.gov](mailto:csalyers@wlf.la.gov) and main phone number of her office is 337-491-2593

- 30 October 2009: E-mailed to follow up and check if received questionnaire
- 23 December 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Carrie Salyers, [csalyers@wlf.la.gov](mailto:csalyers@wlf.la.gov) since she misplaced the first one.
- 11 January 2010: Carrie Salyers, Biologist, submitted a completed questionnaire by FedEx

Department of Agriculture and Forestry; 5825 Florida Boulevard, Baton Rouge, Louisiana 70806

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Commissioner, Dr. Mike Strain, [commissioner@ldaf.state.la.us](mailto:commissioner@ldaf.state.la.us)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire

Louisiana Department of Health and Hospitals  
Jimmy Guidry, State Health Officer & Medical Director  
P.O. Box 629 Baton Rouge, LA 70821-0629  
225.342.3417

- 30 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [Cprentis@dhh.la.gov](mailto:Cprentis@dhh.la.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 23 December 2009: called to follow up lady got our info and would call back
- 23 December 2009: Dr. Gary Balsamo, State Public Health Veterinarian, Office of Public Health, 504-219-4593, [gary.balsamo@la.gov](mailto:gary.balsamo@la.gov), submitted statistics on rabies

## MAINE

Department of Inland Fisheries and Wildlife

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Vasco "Buster" Carter, [Vasco.carter@maine.gov](mailto:Vasco.carter@maine.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 13 March 2010: Resent initial request to participate and both forms of questionnaire.
- 5 May 2010: Talked to receptionist of Department Inland Fisheries and Wildlife and she said that no one within the wildlife division would have any information regarding ferrets. They are considered 100% domesticated and would probably be eaten before any population could establish. Referred me to Dept of Ag.

Department of Agriculture, Food, and Rural Resources  
(ferret treated as pet, so this Dept. regulates);  
Deering Bldg. - AMHI Complex, 28 State House Station Augusta, ME 04333-0028  
Seth H. "Brad" Bradstreet, III, Commissioner; 207.287.3419

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: State Vet, Donald Hoenig, VMD, [Donald.E.Hoenig@maine.gov](mailto:Donald.E.Hoenig@maine.gov)
- 27 October 2009: Dr. Hoenig submitted hardcopy responses by FedEx

Department of Health and Human Services  
221 State Street, Augusta, ME 04333  
207.287.3707

- 1 October 2009: Mailed hardcopy of questionnaire to: 221 State Street, Augusta, ME 04333
- 20 October 2009: Called to follow up: Julie Crosby personal number 207.287.1706 (left message) Administration phone 207.287.2727
- 20 October 2009: Maine's Health & Env Testing Lab, Rabies Dept. called Graening; they said they were the wrong agency, and referred to Maine State Epidemiologist, 800 821 5821; Graening called and was directed to

send email to the State Vet Don Hoenig at [disease.reporting@maine.gov](mailto:disease.reporting@maine.gov); questionnaire already sent to this individual; need to follow up my email

## MARYLAND

Department of Natural Resources: 877.620.8367 (general line)

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Robert Colona, 410.221.8838 x 101, [rcolona@dnr.state.md.us](mailto:rcolona@dnr.state.md.us)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 23 December 2009: Left message for Robert Colona
- 20 January 2009: Cindy P. Driscoll [cdriscoll@dnr.state.md.us](mailto:cdriscoll@dnr.state.md.us) submitted completed electronic version of questioners with feedback from Dr. Guy Hohenhaus from MD Department of Agriculture .

Department of Agriculture

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Secretary of Agriculture, Earl F. Hance, 410.841.5880, [hanceef@mda.state.md.us](mailto:hanceef@mda.state.md.us)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 23 December 2009: Called to follow up transferred to Animal health 410-841-5810, lady said to email questions, questions emailed to [animalhealth@mda.state.md.us](mailto:animalhealth@mda.state.md.us)

Department of Health and Mental Hygiene

Office of the Secretary, 201 West Preston Street, 5th Floor, Baltimore, MD 21201-2301

- 30 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: John M. Colmers, Secretary, 410.767.4639 [JColmers@dnhm.state.md.us](mailto:JColmers@dnhm.state.md.us)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 23 December 2009: Called to follow up talk to Cynthia she said to resend questions will forward to appropriate person, questions emailed to [cguarino@dnhm.state.md.us](mailto:cguarino@dnhm.state.md.us)
- 20 January 2009: Health issues answered by C. Driscoll and others.

## MASSACHUSETTS

Department of Fish and Game: 617.626.1500 (gen. line, directed to: Field HQ: 508.389.6300

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Laura Hajduk, 508.389.6300, [laura.hajduk@state.ma.us](mailto:laura.hajduk@state.ma.us)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 2 November 2009: Dr. Thomas French, Assistant Director, Massachusetts Division of Fisheries and Wildlife, (508) 389-6355, [Tom.French@state.ma.us](mailto:Tom.French@state.ma.us), submitted responses to the questionnaire by email

Department of Food and Agriculture

251 Causeway Street, Suite 500, Boston, MA 02114-2151; 617.626.1700

Animal Health

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dr. Lorraine O' Connor, Chief Veterinarian Health Officer, 617.626.1791, [Lorraine.OConnor@state.ma.us](mailto:Lorraine.OConnor@state.ma.us)
- email address rejected
- 1 October 2009: Mailed hardcopy of questionnaire to: 251 Causeway Street, Suite 500, Boston, MA 02114-2151
- 20 October 2009: Called to follow up: left message
- 30 October 2009: Emailed to follow up to Esther Wegman her email [esther.wegman@state.ma.us](mailto:esther.wegman@state.ma.us)
- 3 November 2009: Esther Wegman said "This would have been forwarded to Fisheries and Wildlife; I believe Bob Arini would be the contact person".

Department of Public Health  
John Auerbach, Commissioner  
250 Washington Street 6<sup>th</sup> Floor, Boston, MA 02108  
617.624.6000

Dr. JudyAnn Bigby, Secretary  
One Ashburton Place, 11<sup>th</sup> Floor, Boston, MA 02108  
617.573.1600

- 1 October 2009: Mailed hardcopy of questionnaire to: One Ashburton Place, 11<sup>th</sup> Floor, Boston, MA 02108
- 20 October 2009: Called to follow up: got an email for secretary from front desk  
[judyann.bigby@massmail.state.ma.us](mailto:judyann.bigby@massmail.state.ma.us)
- 20 October 2009: E-mailed to follow up and check if agency received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.

## MICHIGAN

Department of Natural Resources: Wildlife Division: 517.373.1263

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Adam Bump, Furbearer specialist, 517.373.9336, [bumpa@michigan.gov](mailto:bumpa@michigan.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.

Department of Agriculture  
P.O. Box 30017, Lansing, Michigan, 48909

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [mda-info@michigan.gov](mailto:mda-info@michigan.gov)
- 2 October 2009: Michele M Finateri, DVM, Program Manager for Licensing and Rabies, submitted a completed PDF questionnaire by email

Michigan Department of Community Health  
Capitol View Building, 201 Townsend Street, Lansing, Michigan 48913  
Director's Office, Janet Olszewski, Director

- 30 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Christine Norris, Secretary, [norris@michigan.gov](mailto:norris@michigan.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 12 March 2010: Sent E-mail of original request to participate and both versions of questionnaire.
- 16 March 2010: Auto reply from Christine Norris, I will be out of the office Thursday, March 4 through Monday, March 15. Please redirect your e-mail to Helene Larson at [Larson@michigan.gov](mailto:Larson@michigan.gov).
- 16 March 2010: Sent initial request to participate and both versions of questionnaire to Helene Larson, [Larson@michigan.gov](mailto:Larson@michigan.gov).

## MINNESOTA

Dept. of Natural Resources: 651.296.6157  
Division of Fish and Wildlife

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Jason Abraham, Furbearer biologist, [Jason.abraham@dnr.state.mn.us](mailto:Jason.abraham@dnr.state.mn.us)

- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 28 October 2009: Jason Abraham, Furbearer biologist, [Jason.abraham@dnr.state.mn.us](mailto:Jason.abraham@dnr.state.mn.us) submitted a completed questionnaire by email

#### Department of Agriculture

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Gene Hugoson, Commissioner, 651.201.6219, [Gene.Hugoson@state.mn.us](mailto:Gene.Hugoson@state.mn.us)
- 20 October 2009: received questionnaire by FedEx from Kris Petrini, MN Board of Animal Health, 651.201.6805, [kris.petrini@bah.state.mn.us](mailto:kris.petrini@bah.state.mn.us)

Minnesota Department of Health  
Dr. Sanne Magnan, Commissioner  
P.O. BOX 64975, St. Paul, MN 55164-0975  
651.201.5810

- 1 October 2009: Mailed hardcopy of questionnaire to: P.O. BOX 64975, St. Paul, MN 55164-0975
- 20 October 2009: Called to follow up: don't remember, would prefer email version of questionnaire [health.commissioner@state.mn.us](mailto:health.commissioner@state.mn.us)
- 20 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [health.commissioner@state.mn.us](mailto:health.commissioner@state.mn.us)
- 13 March 2010: Sent initial request to participate and two versions of the questionnaire.
- 31 March 2010: Received completed electronic questionnaire from Joni Scheftel, Minnesota Dept. of health, State Public health veterinarian.

#### MISSISSIPPI

Department of Wildlife, Fisheries, and Parks: 601.432.2400 (general line)

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Richard Rummell, [Richardr@mdwfp.state.ms.us](mailto:Richardr@mdwfp.state.ms.us)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 23 December 2009: Called to follow up Richard Rummell out of office till Monday
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire.
- 13 March 2010: Sent initial request to participate and two versions of the questionnaire.
- 9 April 2010: Called Richard Rummel and he completed a phone survey.

Department of Agriculture and Commerce  
Board of Animal Health  
P.O. Box 3889, Jackson, MS 39207

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Watson, D.V.M., Director, 601.359.1170, [JimW@mdac.state.ms.us](mailto:JimW@mdac.state.ms.us)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 23 December 2009: Called to follow up Talked to Watson he said to resend questions, questions emailed to [JimW@mdac.state.ms.us](mailto:JimW@mdac.state.ms.us)
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire.
- 5 March 2010: Called Jim Watson, left a message and resent questionnaire with personalized header.
- 13 March 2010: Sent initial request to participate and two versions of the questionnaire



Mississippi State Department of Health  
Ed Thompson, State Health Officer  
Post Office Box 1700, Jackson, MS 39215-1700  
601.576.7634

- 1 October 2009: Mailed hardcopy of questionnaire to: Post Office Box 1700, Jackson, MS 39215-1700
- 20 October 2009: Called to follow up: front desk gave Ed Thompson's secretary email [alex.woods@msdh.state.ms.us](mailto:alex.woods@msdh.state.ms.us), as both were not in the office
- 30 October 2009: E-mailed to follow up and check if agency received questionnaire
- 23 December 2009: Called to follow up talked to Alex Woods, he asked to resend questions since doesn't recall getting it, questions emailed to [alex.woods@msdh.state.ms.us](mailto:alex.woods@msdh.state.ms.us)
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire.
- 13 March 2010: Sent initial request to participate and two versions of the questionnaire
- 19 March 2010: Received email from Brigid Elchos, RN, DVM, Deputy State Veterinarian, State Public Health Vet., Board of Animal Health, and was referred to Officer Richard Rummel at the MS Department of Wildlife, Fisheries and Parks. (they forwarded questionnaire and details to Richard, but check up on status in a week)

## MISSOURI

Dept. of Conservation: 573.751.4115  
Wildlife Division; transferred to Resource Science:

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Stephanie Gibson, Office manager, Resource Science, 573.882.9880, [Stephanie.gipson@mdc.mo.gov](mailto:Stephanie.gipson@mdc.mo.gov)
- 20 October 2009: Denise Bateman will receive questionnaire; emailed questionnaire to: [denise.bateman@mdc.mo.gov](mailto:denise.bateman@mdc.mo.gov)
- 4 November 2009: Jeff Beringer, Missouri Dept. of Conservation, [jeffboringer@mdc.mo.gov](mailto:jeffboringer@mdc.mo.gov), 573.882.9909, mailed hardcopy responses to questionnaire.

Missouri Department of Agriculture  
Department of Agriculture, 1616 Missouri Blvd., Jefferson City, MO 65102  
573.751.4211

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [aginfo@mda.mo.gov](mailto:aginfo@mda.mo.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 19 October 2009: Got E-mail response from Donna Cooper, Special Assistant to the Director of Ag., (573) 751-2613, [donna.cooper@mda.mo.gov](mailto:donna.cooper@mda.mo.gov): "This request should be sent to MDC."
- 13 March 2010: Sent initial request to participate and two versions of the questionnaire to State Veterinarian Taylor Woods, Dept of Ag. Animal health division, [taylor.woods@mda.mo.gov](mailto:taylor.woods@mda.mo.gov), 573-751-3377

State of Missouri Department of Health and Senior Services  
Margaret T. Donnelly, Director  
P.O. Box 570, Jefferson City, Missouri 65102  
573.751.6400

- 1 October 2009: Mailed hardcopy of questionnaire to: P.O. Box 570, Jefferson City, Missouri 65102
- 20 October 2009: Called to follow up: they received it and send it to MDC
- 20 October 2009: Denise Bateman of MDC left voicemail; she will receive questionnaire but needs a copy
- follow up on this

## MONTANA

Dept. of Fish, Wildlife and Parks: 406.444.3186

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Laurie Hanauska-Brown, Non-game biologist, [lhanauska-brown@mt.gov](mailto:lhanauska-brown@mt.gov)
- 27 October 2009: Tim Feldner, Manager, Commercial Wildlife Permitting, [tfeldner@mt.gov](mailto:tfeldner@mt.gov), submitted a finished questionnaire by email

Montana Department of Agriculture  
406.444.3144

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [agr@mt.gov](mailto:agr@mt.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 13 March 2010: Sent initial request to participate and both versions of questionnaire to Dr. Martin Saluski, State Veterinarian, Dept. of livestock Animal health Division, 406-444-2043, [mzaluski@mt.gov](mailto:mzaluski@mt.gov)

Department of Public Health and Human Services  
Anna Whiting Sorrell, Director  
PO Box 4210, Helena MT 59604-4210  
406.444.5622

- 1 October 2009: Mailed hardcopy of questionnaire to: PO Box 4210, Helena MT 59604-4210
- 20 October 2009: Called to follow up: left message, email address of directors Manager Mary Eve's email address [mkulawik@mt.gov](mailto:mkulawik@mt.gov)
- 20 October 2009: E-mailed to follow up and check if agency received questionnaire
- 20 October 2009: E-mail response from directors Manager Mary Eve she said they received survey at the Director's office and directed it to the Public Health & Safety Division.
- 19 March 2010: Sent initial request to participate and both versions of questionnaire to Dr. Kammy Johnson, [drkjohnson@mt.gov](mailto:drkjohnson@mt.gov), epidemiologist of public health and safety division. 444-7453

## NEBRASKA

Game and Parks Commission 402.471.0641 (could not get thru; try again)  
Ted Blume, Admin.: 402.471.4010; [ted.blume@nebraska.gov](mailto:ted.blume@nebraska.gov)

- 15 September 2009: Mailed hardcopy of questionnaire to: Nebraska Wildlife Division, 2200 N. 33rd St., Lincoln, NE 68503
- 5 October 2009: Sam Wilson, Furbearer Program Manager, mailed by FedEx responses to the hardcopy questionnaire

Department of Agriculture  
Bureau of Animal Industry

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dr. Dennis A. Hughes, State Veterinarian, 402.471.2351, [agr.webmaster@nebraska.gov](mailto:agr.webmaster@nebraska.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 13 March 2010: Sent initial request to participate and both versions of questionnaire. To state vet. Dr. Dennis Hughes, [dennis.hughes@nebraska.gov](mailto:dennis.hughes@nebraska.gov), 402-471-2351

Nebraska Department of Health and Human Services  
Joann Schaefer, Director and Chief Medical Officer  
P.O. Box 95026, Lincoln, Nebraska 68509-5026  
402.471.8566

- 1 October 2009: Mailed hardcopy of questionnaire to: P.O. Box 95026, Lincoln, Nebraska 68509-5026
- 20 October 2009: Called to follow up: left message

- Call again
- 19 March 2010: Sent original request to participate and both versions of questionnaire to Tom Safranek M.D. State epidemiologist with Nebraska Public health division. [tom.safranek@dnhss.ne.gov](mailto:tom.safranek@dnhss.ne.gov), 402-471-2937.

## NEVADA

Dept. of Wildlife: 775.423.3171

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Non-game biologist Jenny Jeffers: [jjeffers@ndow.org](mailto:jjeffers@ndow.org)
- (email address is bad?)
- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Director Kenneth Mayer, 775.688.1500, [kemayer@ndow.org](mailto:kemayer@ndow.org)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 23 December 2009: Called to follow up left message
- 23 December 2009: Suzanne Scourby, Executive Assistant to Director Mayer, (775) 688-1599, responded by email, [sscourby@ndow.org](mailto:sscourby@ndow.org) and identified 2 entities to which to send the questionnaire: [rbonamici@ndow.org](mailto:rbonamici@ndow.org) and Wildlife Diversity Division [satkinson@ndow.org](mailto:satkinson@ndow.org)
- 26 December 2009: questionnaires sent by email to: [rbonamici@ndow.org](mailto:rbonamici@ndow.org) and Wildlife Diversity Division [satkinson@ndow.org](mailto:satkinson@ndow.org)
- 6 January 2010: Shirley J. Atkinson Supervisory Biologist emailed response to questionnaire

Department of Agriculture

775.353.3600 recording

775.353.3601 operator

405 South 21st St., Sparks NV 89431

Animal Industry

Dr. Phillip LaRussa, Director

- 6 October 2009: Mailed hardcopy of questionnaire to: 405 South 21st St., Sparks NV 89431
- 20 October 2009: Called to follow up: left message
- 23 December 2009: called to follow up transferred to 775-353-3718 Dr. Rink might be person who got it, out of office will be back on 29<sup>th</sup> December
- 13 March 2010: Sent initial request to participate and both versions of questionnaire to State Vet. Dr. Phil LaRussa, Division of Animal Industry, 775-353-3755, [plarussa@agri.state.nv.us](mailto:plarussa@agri.state.nv.us)

Nevada Department of Health and Human Services (Nevada State Health Division)

Tracey D. Green, State Health Officer

4150 Technology Way, Carson City, Nevada 89706

775.684.4200

- 1 October 2009: Mailed hardcopy of questionnaire to: 4150 Technology Way, Carson City, Nevada 89706
- 20 October 2009: Called to follow up: don't remember getting anything would prefer email version Janet Osalvo [josalvo@health.nv.gov](mailto:josalvo@health.nv.gov)
- 20 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [josalvo@health.nv.gov](mailto:josalvo@health.nv.gov)
- 23 December 2009: Called to follow up talk to Janet Osalvo she said it was unrelated to their agency rather contact agriculture department

## NEW HAMPSHIRE

Dept. of Fish and Game: 603.271.2461 (or 2)

Wildlife Division 603.271.2461; Steve Weber, Director's office: 603.271.3511 (left message)

New Hampshire Fish and Game Department

- 15 September 2009: Mailed hardcopy of questionnaire to: New Hampshire Fish and Game Department, 11 Hazen Drive, Concord, NH 03301
- 27 September 2009: Patrick Tate, Furbearer Project Leader, sent by FedEx a finished hardcopy questionnaire

Department of Agriculture, Markets, and Food  
Division of Animal Industry, 603.271.2404

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Stephen K. Crawford, State Veterinarian, [scrawford@agr.state.nh.us](mailto:scrawford@agr.state.nh.us)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 13 March 2010: Sent initial request to participate and both versions of questionnaire to State Vet, Stephen Crawford, State Vet, 603-271-2404, [scrawford@agr.state.nh.us](mailto:scrawford@agr.state.nh.us)

New Hampshire Department of Health and Human Services  
Nicholas A. Toumpas, Commissioner  
NH DHHS Division of Public Health Services, Office of the Commissioner, 29 Hazen Drive, Concord, NH 03301-4604  
603.271.4331

- 1 October 2009: Mailed hardcopy of questionnaire to: 29 Hazen Drive, Concord, NH 03301-4604
- 20 October 2009: Called to follow up: left message

## NEW JERSEY

Dept. of Envir. Protection  
Division of Fish and Wildlife: Exotic and Non-game Program  
Permitting/exotic species: 908.292.2965 (left message)  
[www.njfishandwildlife.com/](http://www.njfishandwildlife.com/)  
permits for various ownership/sale/breeding of ferrets

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [exoticpermits@dep.state.nj.us](mailto:exoticpermits@dep.state.nj.us)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 21 October 2009: Got email response: From Linda DiPiano, Principal Biologist Phone (908) 735-5450, she received the questionnaire and will be getting it back to us as soon as possible.
- 30 November 2009: Linda DiPiano, Principal Biologist, 908.735.5450, [linda.dipiano@dep.state.nj.us](mailto:linda.dipiano@dep.state.nj.us), submitted questionnaire responses by regular mail

Department of Agriculture  
Office of the Secretary

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Media Inquiries, Lynne Richmond, 609.633.2954, [Lynne.Richmond@ag.state.nj.us](mailto:Lynne.Richmond@ag.state.nj.us)
- 30 September 2009: Sebastian Reist, DVM, Principal Veterinarian, submitted a completed PDF questionnaire by email

State of New Jersey Department of Health and Senior Services  
Heather Howard, Commissioner  
John Fitch Plaza, PO Box 360, Trenton, NJ 08625  
609.292.7837

- 1 October 2009: Mailed hardcopy of questionnaire to: John Fitch Plaza, PO Box 360, Trenton, NJ 08625
- 20 October 2009: Called to follow up: Send it to Public health services, they will call us back

- 30 November 2009: Dr. Colin Campbell, Deputy State Public Health Veterinarian, 609.588.3121, [colin.campbell@doh.state.nj.us](mailto:colin.campbell@doh.state.nj.us), submitted questionnaire responses through Linda DiPiano (Division. of Fish & Wildlife)'s mailed package

## NEW MEXICO

Department of Game and Fish: 505.476.8000 (could not get thru)

- 15 September 2009: Mailed hardcopy of questionnaire to: New Mexico Department of Game and Fish, One Wildlife Way, Santa Fe, New Mexico 87507
- 13 October 2009: Called to follow up: left a message
- 30 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [ispa@state.nm.us](mailto:ispa@state.nm.us)
- 23 December 2009: Called to follow up left a message
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 19 February 2010: Sante Fe Wildlife Management Operations contact, [James.Lane@state.nm.us](mailto:James.Lane@state.nm.us), sent questionnaire. Resent original request to participate letter and both forms of questionnaire.
- 6 March 2010: Called Jim Lane at 505-476-8038, no one was available, office closed for the day?
- 13 March 2010: Sent initial request to participate and both versions of questionnaire
- 19 March 2010: Called James Lane, Left message! Sent request to participate and both versions questionnaire to Public information and outreach director, Martin Frentzel, [martin.frentzel@state.nm.us](mailto:martin.frentzel@state.nm.us). 476-8000.
- 26 March 2010: Dan Brooks, Chief, Law Enforcement Division responded by email with a partially completed questionnaire and recommended the NM department of health.
- 10 May 2010: sent email of questionnaire to Jim Hirsch, Conservation Services Division 505-476-8036 [jhirsch@state.nm.us](mailto:jhirsch@state.nm.us).

Department of Agriculture 575-646-3007

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dr. I. Miley Gonzalez, Director/Secretary, [nmagsec@nmda.nmsu.edu](mailto:nmagsec@nmda.nmsu.edu)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 19 October 2009: Got E-mail response from Dr. I. Miley Gonzalez: "No one here has received a survey or is they able to respond since this is not in our purview."
- 23 December 2009: Called to follow up lady said they don't deal with it need to send questions to 505-841-6161 New Mexico livestock board office
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 26 February 2010: E-mail from Miley Gonzalez [MGonzalez@nmda.nmsu.edu](mailto:MGonzalez@nmda.nmsu.edu), said the Director for Veterinary Diagnostic Services has forwarded this to NM Game and Fish.
- 5 March 2010: Sent request and questionnaire to Dr. Dave E. Fly state veterinarian, New Mexico Livestock Board, [Dave.fly@state.nm.us](mailto:Dave.fly@state.nm.us), 505-841-6163
- 19 March 2010: Called, he is out of office. Forwarded to Dr. Joe Baker, NM Field Veterinarian. [JoeB.Baker@state.nm.us](mailto:JoeB.Baker@state.nm.us), sent Joe Baker request and questionnaire.
- 9 April 2010: Called Dr. Dave Fly, to try to get a phone response or forwarding number to Joe Baker, but there was no answer and no message service.

Veterinary Diagnostic Services

R. Flint Taylor, DVM, Division Director, [ddvds@nmda.nmsu.edu](mailto:ddvds@nmda.nmsu.edu)

- 19 March 2010: Sent initial request to participate and both versions of questionnaires.

New Mexico Department of Health

1190 South Saint Francis Drive, Santa Fe, NM 87502

Office of the Secretary 505 827.2613

- 1 October 2009: Mailed hardcopy of questionnaire to: 1190 South Saint Francis Drive, Santa Fe, NM 87502
- 20 October 2009: Called to follow up: Epidemiology Department 505.827.0006 might have got it,
- 12 November 2009: Called to follow up: Epidemiology department do not deal with it
- 23 December 2009: Called to follow up nobody recall getting questionnaire talked to Monica Brackney in Epidemiology Department, emailed questions to [Monica.brackney@state.nm.us](mailto:Monica.brackney@state.nm.us)
- 23 December 2009: Monica Brackney, [Monica.Brackney@state.nm.us](mailto:Monica.Brackney@state.nm.us), requested that her colleague, Elizabeth Hatton, [Elizabeth.Hatton@state.nm.us](mailto:Elizabeth.Hatton@state.nm.us), answer the questionnaire
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire.
- 12 March 2010: Received email from Monica Brackney, Dept. of Health [Monica.Brackney@state.nm.us](mailto:Monica.Brackney@state.nm.us), saying that she sent it to a person in Dept. of Game and Fish

## NEW YORK

Dept. of Environmental Conservation  
Division of Fish, Wildlife, & Marine Resources  
Bureau of Wildlife 518.402.8919

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [fwwildf@gw.dec.state.ny.us](mailto:fwwildf@gw.dec.state.ny.us)
- 25 September 2009: Gordon R. Batcheller, Certified Wildlife Biologist, 518.402.8885, [grbatche@gw.dec.state.ny.us](mailto:grbatche@gw.dec.state.ny.us), sent the completed questionnaire by email.
- 20 October 2009: Patrick P. Martin, NYS Department of Environmental Conservation Special Licenses Unit, 625 Broadway, Albany, NY 12233-4752, 518-402-8993, [pxmartin@gw.dec.state.ny.us](mailto:pxmartin@gw.dec.state.ny.us), emailed responses to questionnaire

Department of Agriculture and Markets  
Division of Animal Industry

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: John Huntley, DVM, Director, 518.457.3502, [dai@agmkt.state.ny.us](mailto:dai@agmkt.state.ny.us)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 13 March 2010: Sent initial request to participate and both versions of questionnaire

New York State Department of Health  
Richard F. Daines, Commissioner  
Corning Tower, Empire State Plaza, Albany, NY 12237

- 1 October 2009: Mailed hardcopy of questionnaire to: Corning Tower, Empire State Plaza, Albany, NY 12237
- 20 October 2009: Felicia Green, Div. of Ext. Affairs, 518.474.2011, responded by letter, stating that they were forwarding their questionnaire to the Dept. of Environmental Conservation, Commissioner Grannis
- follow up on this

## NORTH CAROLINA

Wildlife Resources Commission  
Wildlife Management Division: 919.707.0050

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Colleen Olfenbuttel, Furbearer biologist, 919.629.2644, [Colleen.olfenbuttel@ncwildlife.org](mailto:Colleen.olfenbuttel@ncwildlife.org)
- 27 October 2009: Perry Sumner, Section Manager for Surveys and Research and Wildlife Division, [perry.sumner@ncwildlife.org](mailto:perry.sumner@ncwildlife.org), submitted hardcopy responses by FedEx

Department of Agriculture and Consumer Services



Veterinary Division, Dr. David Marshall, DVM, State Veterinarian  
1030 Mail Service Center, Raleigh, NC 27699-1030  
919.733.7601

- 1 October 2009: Mailed hardcopy of questionnaire to: 1030 Mail Service Center, Raleigh, NC 27699-1030
- 20 October 2009: Called to follow up: Got email for Veterinarian secretary [Dianne.whitman@ncagr.gov](mailto:Dianne.whitman@ncagr.gov)
- 20 October 2009: E-mailed to follow up and check if agency received questionnaire
- 13 March 2010: resent initial request to participate and both versions questionnaire.

North Carolina Department of Health and Human Services  
Jeffrey P. Engel, Division Director and State Health Director  
1931 Mail Service Center, Raleigh, NC 27699-1931  
919.707.5000

- 1 October 2009: Mailed hardcopy of questionnaire to: 1931 Mail Service Center, Raleigh, NC 27699-1931
- 20 October 2009: Called to follow up: left a phone number they will contact us

## **NORTH DAKOTA**

North Dakota Game and Fish Department: 701.328.6305  
Director Terry Steinwand

- 15 September 2009: Mailed hardcopy of questionnaire to: North Dakota Game and Fish Department, 100 N. Bismarck Expressway, Bismarck, ND 58501-5095
- 13 October 2009: Called to follow up: left a message (extension 86305). Dr. Graening got call back from 701-328-6302 Lady was not the correct person, but she will check with the Non-game Section—that is the appropriate office to respond to questionnaire; she said she would call back
- 30 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [ndgf@nd.gov](mailto:ndgf@nd.gov)
- 23 December 2009: Called to follow up left a message
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 19 February 2009: Sent inquiry letter to furbearer biologist, Stephanie Tucker ([satucker@nd.gov](mailto:satucker@nd.gov)), resent original request to participate letter and both forms questionnaire. She responded 19 February 2010 , identified that the survey was forwarded to ND board of animal health. The NDBAH has Susan Keller listed as state veterinarian, she is listed as contact below in Department of Agriculture.
- 26 February 2010: [ndfg@nd.gov](mailto:ndfg@nd.gov) responded by email that they forwarded to the ND Board of Animal Health for a response.

Department of Agriculture  
Livestock Industries

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: State Veterinarian, Dr. Susan Keller, DVM, 328.2657; Cell 220.0092, [skeller@nd.gov](mailto:skeller@nd.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 23 December 2009: called to follow up not in office would be back next week
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 13 March 2010: Resent initial request to participate and both versions of questionnaire.

North Dakota Department of Health  
600 East Boulevard Avenue, Bismarck, N.D. 58505-0200

- 1 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Terry Dwelle, State Health Officer, 701.328.2372, [tdwelle@nd.gov](mailto:tdwelle@nd.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 23 December 2009: called to follow up talked to Terry Dwelle their people working on it will get before deadline
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 5 March 2010: Called, talked to Terry Dwelle, he asked for the questionnaire to be resent to himself and his ex. Secretary, he would start on survey and resend to appropriate channels.
- 12 March 2010: Received completed survey response from Kirby Kruger, State Epidemiologist, North Dakota Department of Health 701-328-2378

## OHIO

Ohio Department of Natural Resources

Wildlife Division

614.265.6304

1840 Belcher Drive, Fountain Square, Bldg G, Columbus, OH 43224-1329

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Division Director Dave Scott (614.265.6338), [dave.scott@dnr.state.oh.us](mailto:dave.scott@dnr.state.oh.us)
- 22 October 2009: Dr. Smith suggested sending questionnaire to: Carolyn Caldwell, Assistant Administrator, 614.265.6329, [carolyn.caldwell@dnr.state.oh.us](mailto:carolyn.caldwell@dnr.state.oh.us)
- 30 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Carolyn Caldwell, Assistant Administrator, [carolyn.caldwell@dnr.state.oh.us](mailto:carolyn.caldwell@dnr.state.oh.us)
- 13 March 2010: Resent initial request to participate and both forms of questionnaire.
- 7 May 2020: Called and was referred to Carolyn Caldwell, 614-265-6329

Department of Agriculture

Division of Animal Industry

8995 East Main Street, Reynoldsburg, OH 43068-3399

614.728.6220

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [animal@agri.ohio.gov](mailto:animal@agri.ohio.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 22 October 2009: Dr. Smith suggested sending questionnaire to: Dr Tony Forshey, State Veterinarian, (614) 728-6220, [tforshey@agri.ohio.gov](mailto:tforshey@agri.ohio.gov)
- 30 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dr Tony Forshey, State Veterinarian, [tforshey@agri.ohio.gov](mailto:tforshey@agri.ohio.gov)
- 13 March 2010: Resent initial request to participate and both forms of questionnaire.

Ohio Department of Health

PO Box 1430, Reynoldsburg, OH 43068-6430

- 1 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Director, [Director@odh.ohio.gov](mailto:Director@odh.ohio.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 22 October 2009: Dr. Kathleen Smith, State Public Health Veterinarian, (614) 466-0283, [kathy.smith@odh.ohio.gov](mailto:kathy.smith@odh.ohio.gov), submitted a completed questionnaire by email

## OKLAHOMA

Department of Wildlife Conservation

- 23 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Mark Howery, Non-game Program, [mhowery@zoo.odwc.state.ok.us](mailto:mhowery@zoo.odwc.state.ok.us)

- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 29 October 2009: Mark Howery mailed hardcopy responses to Dr. Graening at CSUS

Department of Agriculture, Food, and Forestry  
Division of Animal Industry

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dr. Becky Brewer, State Veterinarian, 405.522.6131, [becky.brewer@oda.state.ok.us](mailto:becky.brewer@oda.state.ok.us)
- 5 October 2009: Dr. Brewer-Walker submitted responses on PDF form by email

Oklahoma State Department of Health  
1000 NE 10<sup>th</sup>, Oklahoma City, OK 73117  
405.271.5600

- 5 October 2009: 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [webmaster@health.ok.gov](mailto:webmaster@health.ok.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire

## OREGON

Oregon Department of Fish and Wildlife  
Wildlife Division, 503.947.6300, 3406 Cherry Ave., Salem OR 97303

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Rick Boatner, [rick.j.boatner@state.or.us](mailto:rick.j.boatner@state.or.us)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 13 March 2010: Resent initial request to participate and both forms of questionnaire.
- 7 May 2010: Sent questionnaire to Kieth Kohl, terrestrial invasive species specialist and Janice Bellis, Division support.

Oregon Department of Agriculture  
Information Office, 503.986.4550

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [info@oda.state.or.us](mailto:info@oda.state.or.us)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire

Public Health Division  
Office of the State Public Health Officer  
800 NE Oregon St. Suite 930, Portland, OR 97232

- 1 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: State Public Health Officer, 503-731-4000, [melvin.a.kohn@state.or.us](mailto:melvin.a.kohn@state.or.us)
- 7 October 2009: Veterinarian Emilio DeBess, Oregon Dept. of Health, faxed back responses on the PDF form to the CSUS Biological Sciences Office.

## PENNSYLVANIA

Pennsylvania Department of Conservation and Natural Resources  
Pennsylvania Game Commission, Wildlife Management 717.787.5529  
[pgccomments@state.pa.us](mailto:pgccomments@state.pa.us)

- 15 September 2009: Mailed hardcopy of questionnaire to: Pennsylvania Game Commission, 2001 Elmerton Avenue, Harrisburg, Pennsylvania 17110-9797
- 13 October 2009: Called to follow up: they received it but are still looking who could be a best person to answer it.

- 20 October 2009: completed questionnaire sent by FedEx, Matthew Lovallo, 814.422.8525, [mlovallo@state.pa.us](mailto:mlovallo@state.pa.us)

Pennsylvania Department of Agriculture  
2301 North Cameron Street, Harrisburg PA 17110  
General Information 717.787.4737  
Animal Health & Diagnostic Services 717.772.2852

- 1 October 2009: Mailed hardcopy of questionnaire to: 2301 North Cameron Street, Harrisburg PA 17110
- 10 November 2009: Called to follow up: lady on info desk can't tell if they received and was not familiar with ferrets at all so couldn't tell which would be appropriate person to contact.
- need to follow up

Pennsylvania Department of Health  
Health and Welfare Building, 7th & Forster Streets, Harrisburg, PA 17120

- 1 October 2009: Mailed hardcopy of questionnaire to: Health and Welfare Building, 7th & Forster Streets, Harrisburg, PA 17120
- 10 November 2009: Called to follow up: 1-877-PA-HEALTH Couldn't pass the recording
- Need to find more appropriate number
- 13 March 2010: Resent initial request to participate and both forms of questionnaire to State Veterinarian, Bureau of Animal Health and Diagnostic Services, Dr. Craig Shultz, (717) 772-2852, [crashultz@state.pa.us](mailto:crashultz@state.pa.us)

## PUERTO RICO

Department of Agriculture  
1309 Ave Fernandez Juncos, Pda. 19 1 / 2, Floor 2, San Juan, PR 00908-1163  
(787) 721-2120,  
[enegron@da.gobierno.pr](mailto:enegron@da.gobierno.pr)

- 31 March 2010: Sent initial request to participate and questionnaire to general contact, [enegron@da.gobierno.pr](mailto:enegron@da.gobierno.pr)
- 31 March 2010: sent initial request to participate and questionnaire to St. Veterinarian, PR Dr. Héctor Díaz-Collazo, Veterinary in Charge, Puerto Rico Department of Agriculture e-mail: [hjdiaz\\_veterinaria@yahoo.com](mailto:hjdiaz_veterinaria@yahoo.com). (787) 766-6050
- 7 May 2010: Called Natural resources of the commonwealth of PR, 787-999-2200-ext 2665
- 

Department of Environmental and Natural Resources  
<http://www.drna.gobierno.pr/>  
in charge of monitoring wildlife on and around the island.

## RHODE ISLAND

DEM Division of Fish and Wildlife: Headquarters: 401.789.3094; directed to Great Swamp 401.789.0281

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Brian Tefft, 401.789.0281, [brian.tefft@dem.ri.gov](mailto:brian.tefft@dem.ri.gov)
- 4 October 2009: Charlie Brown, Wildlife Biologist, submitted a finished questionnaire by email; stated that "Attached is the ferret survey which was completed with the help of our state veterinarian, Dr. Scott Marshall."

Division of Agriculture  
235 Promenade Street, Providence, RI 02908-5767; 401.222.2781

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Kenneth Ayars, Chief, [ken.ayars@dem.ri.gov](mailto:ken.ayars@dem.ri.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 13 March 2010: Resent initial request to participate and both forms of questionnaire

- 13 March 2010: Sent initial request to participate and both forms of questionnaire to State Veterinarian, Dr. Scott Marshall, Rhode Island Division of Agriculture, (401) 222-2781 ext. 4503, [scott.marshall@dem.ri.gov](mailto:scott.marshall@dem.ri.gov)

Department of Health  
401-222-5960

- 1 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to:  
[Website.DOH@health.ri.gov](mailto:Website.DOH@health.ri.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire

## **SOUTH CAROLINA**

Department of Natural Resources  
Wildlife and Freshwater Fisheries 803.734.3886  
Law Enforcement 803.734.400

- 15 September 2009: Mailed hardcopy of questionnaire to: South Carolina Department of Natural Resources, Rembert C. Dennis Building, 1000 Assembly Street, Columbia, SC 29201
- 5 October 2009: Jay Butfiloksi, Furbearer Project Supervisor, Wildlife Section, mailed by FedEx responses to hardcopy questionnaire

Department of Agriculture  
PO Box 11280, Columbia, SC 29211; 803.734.2210

- 1 October 2009: Mailed hardcopy of questionnaire to: PO Box 11280, Columbia, SC 29211
- 23 October 2009: Called to follow up; said must have been sent to either United States Department of Agriculture 803-806-3830 or State Veterinarian 803-788-6620. Called the state veterinarian; she said she didn't receive it and is neither interested

Department of Health and Environmental Control  
2600 Bull Street, Columbia, SC 29201

- 1 October 2009: Mailed hardcopy of questionnaire to: 2600 Bull Street, Columbia, SC 29201
- need a number to call; couldn't find number on website
- 13 March 2010: sent initial request to participate and both forms of questionnaire to State Veterinarian Dr. Boyd Parr, Clemson Livestock Poultry Health Programs, (803) 788-2260 Ext: 231, [bparr@clemson.edu](mailto:bparr@clemson.edu)

## **SOUTH DAKOTA**

Department of Game, Fish and Parks  
Wildlife Division 605.773.3381, [Wildinfo@state.sd.us](mailto:Wildinfo@state.sd.us)

South Dakota Game Fish and Parks

- 15 September 2009: Mailed hardcopy of questionnaire to: South Dakota Game Fish and Parks, 523 East Capitol Avenue, Pierre, SD 57501
- 15 October 2009: Called to follow up: Person on front desk gave her number Silka Kempema 605-773-2742, (very friendly) she said she didn't get it but remember her colleague mentioned about it; her name is Eileen Dowd Stukel; her phone number 605-773-229, and mail [Eileen.dowdstukel@state.sd.us](mailto:Eileen.dowdstukel@state.sd.us)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 21 October 2009: Got email response from Eileen Dowd Stukel, Wildlife Diversity Coordinator, Certified Wildlife Biologist, 605-773-4229: He received it and will complete it as thorough as possible, has also asked for input from the SD State Veterinarian, but hasn't received any reply yet.
- 30 October 2009: Dr. Graening emailed to Eileen to complete portion of questions applicable to his agency

- 19 November 2009: Eileen Dowd Stukel, Wildlife Diversity Coordinator, South Dakota Dept. of Game, Fish and Parks, [eileen.dowdstukel@state.sd.us](mailto:eileen.dowdstukel@state.sd.us), 605.773.4229, submitted a completed questionnaire by FedEx

South Dakota Department of Agriculture  
523 E Capitol Ave, Pierre, SD 57501-3182  
605.773.3375

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [agmail@state.sd.us](mailto:agmail@state.sd.us)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 27 October 2009: Mendel Miller, DVM, Asst. State Veterinarian, South Dakota Animal Industry Board, [Mendel.Miller@state.sd.us](mailto:Mendel.Miller@state.sd.us), submitted a finished questionnaire by email

South Dakota Department of Health

- 1 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [DOH.info@state.sd.us](mailto:DOH.info@state.sd.us)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire

## TENNESSEE

Tennessee Wildlife Resources Agency

Wildlife Division 615.781.6610 (friendly; said ferret classified as class 3 nonnative wildlife not regulated; said that USD? might be able to help their number 703.812.6935)

General Information 615.781.6500, [Ask.TWRA@tn.gov](mailto:Ask.TWRA@tn.gov)

- 15 September 2009: Mailed hardcopy of questionnaire to: Tennessee Wildlife Resources Agency, 440 Hogan Road, Nashville, TN 37220
- 13 October 2009: Called to follow up: Richard Kirk was given questionnaire his email is [Richard.kirk@tn.gov](mailto:Richard.kirk@tn.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 23 December 2009: Called to follow up Richard Kirk out of office will be back on Monday
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 26 February 2010: Walter Cook, Captive Wildlife Coordinator, Tennessee Wildlife Resources Agency submitted completed questionnaire by e-mail from [walter.cook@tn.gov](mailto:walter.cook@tn.gov).

Tennessee Department of Agriculture  
440 Hogan Road, Nashville, TN 37220-9029  
615.837.5103

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Public Information Office: [TN.Agriculture@tn.gov](mailto:TN.Agriculture@tn.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 21 October 2009: Got an e-mail response: John Burkitt, Webmaster wrote the mail was forwarded to Tina Rogers of Animal Health division for handling. At her discretion, it may have been forwarded to a number of qualified technicians.
- 23 December 2009: called to follow up she is out of office will be back on Monday
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 19 February 2010: Sent initial request to participate letter and both forms of questionnaire to Wildlife Division [brenda.ann.williams@state.tn.us](mailto:brenda.ann.williams@state.tn.us)
- 13 March 2010: Resent original request to participate and both versions of questionnaire.

Department of Health (615) 741-3111

- 1 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [tn.health@tn.gov](mailto:tn.health@tn.gov)



- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 23 December 2009: Called to follow up got transferred to couple of departments including 615-741-7206 Department of environmental health they said they don't deal with it
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 26 March 2010: need to follow up

## TEXAS

Texas Parks and Wildlife Department  
512.389.4800 extension 4505 (left message)

- 15 September 2009: Mailed hardcopy of questionnaire to: Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, TX 78744
- 15 October 2009: Called to follow up: they didn't receive it and they don't even deal with domesticated animals, person said agriculture department deals with domesticated animals
- 23 December 2009: Called to follow up couldn't get pass the recording
- 31 March 2010: Left a message with Chris, in permitting, about who to contact to complete the survey, he will be back in the office Thursday, April 1, 2010.
- 9 April 2010: Called, was recommended to contact John Young the State Mammologist at 512.389.4800 ext. 8047.
- 16 April 2010: Called John Young, 512-389-4800, ext 8047. Left a message.
- 16 April 2010: John Young completed a phone survey.

Department of Agriculture  
Public Information Office, 512.463.4075

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [pub.info@TexasAgriculture.gov](mailto:pub.info@TexasAgriculture.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 23 December 2009: Called to follow up said to resend questionnaire to [pub.info@TexasAgriculture.gov](mailto:pub.info@TexasAgriculture.gov)
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 5 March 2010: Called, wanted to transfer me to their communications dept. gave my phone number, 'will call right back', they said. Called back, referred me to Texas Animal Health Commission.
- 5 March 2010: Found State Vet. And animal health commission director Dee Ellis contact info. Sent a questionnaire request to [dee.ellis@tahc.state.tx.us](mailto:dee.ellis@tahc.state.tx.us), 512-719-0700
- Great contact info online: <http://www.tahc.state.tx.us/agency/contact.html>
- 26 March 2010: Called animal health commission number listed above, got nowhere in an automated menu.
- 31 March 2010: Sent initial request and questionnaire to assistant director, State Epidemiology and Laboratories Andy Schwartz, DVM, Andy Schwartz, D.V.M. [stateepi@tahc.state.tx.us](mailto:stateepi@tahc.state.tx.us).
- 9 April 2010: Called 512-719-0700 and got no response.

Dept. of State Health Services  
512.458.7111

- 1 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [customer.service@dshs.state.tx.us](mailto:customer.service@dshs.state.tx.us)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 23 December 2009: Called to follow up they said don't deal with it
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 31 March 2010: Sent request to participate and questionnaire to Disease Reporting department, Rita Espinoza, 512-458-7676, [Rita.Espinoza@dshs.state.tx.us](mailto:Rita.Espinoza@dshs.state.tx.us).

- 9 April 2010: Left a message for Rita Espinoza, and talked to secretary for Infectious Disease Department. She acknowledged that Animal Health Commission NEVER answers their phone, but she recommended Veterinarians for bite-related issues, Dr. Eric Foken, and Jim Sherman. Need to get contact info for them.
- 13 April 2010: Received a call from Rita Espinoza, Infectious Disease Department, she said that their department only deals with human-human transmission and that we should contact animal control.

## UTAH

Utah Division of Wildlife Resources

Regional Administrative Offices 801.538.4700 (closed on Fridays, Saturday, Sunday), [DWRcomment@utah.gov](mailto:DWRcomment@utah.gov)

- 15 September 2009: Mailed hardcopy of questionnaire to: Utah Division of Wildlife Resources, Box 146301, Salt Lake City, UT 84114-6301
- 15 October 2009: Called to follow up: Left a message
- 10 November 2009: Called to follow up again: left a message
- 23 December 2009: Called to follow up said they don't deal with it, later transferred to person who was out of office would be back on Monday left message
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 26 February 2010: E-mailed Utah great basin research center, Jason Vernon — Program Manager, [JasonVernon@utah.gov](mailto:JasonVernon@utah.gov) initial request and questionnaire.
- 13 March 2010: Resent original request to participate and both versions of questionnaire.
- 26 March 2010: Sent initial request to participate and questionnaire to JD Davis, [jd@uwin.org](mailto:jd@uwin.org). Although he is correspondent for Wildlife Protection program, 'wildlife in need' he might provide insight on whom best to contact within the WR agency.
- 26 March 2010: RESENT request and questionnaire to Great Basin Research Center, research biologists, Danny Summers, [DannySummers@utah.gov](mailto:DannySummers@utah.gov) and Therese Meyer, [ThereseMeyer@utah.gov](mailto:ThereseMeyer@utah.gov).
- 31 March 2010: Called and left a message for JD Davis regarding questionnaire.
- 31 March 2010: JD Davis returned my call, said he would try to find a contact in the Utah Division. of wildlife resources who would be able to better answer the questionnaire.
- 16 April 2010: Resent a 'reminder' questionnaire and request to participate to JD Davis, wildlife protection program.

Department of Agriculture and Food

350 N Redwood Road, Salt Lake City UT 84114-6500

(801) 538-7181

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [UDAF-Information@utah.gov](mailto:UDAF-Information@utah.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 23 December 2009: Called to follow up, emailed questionnaire to [wframpton@utah.gov](mailto:wframpton@utah.gov)
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 5 March 2010: Emailed initial request questionnaire to St. Vet. Bruce King. Division of Animal Industry, [bking@utah.gov](mailto:bking@utah.gov), 801-538-7162.
- 13 March 2010: Resent original request to participate and both versions of questionnaire.
- 31 March 2010: Left a message with secretary about status of questionnaire, will call back in an hour.
- 31 March 2010: St. Vet. Bruce king responded (801-521-6210) by phone, answered questions on the short phone survey form.

Utah Department of Health

Center for Health Data  
PO Box 142101, Salt Lake City, UT 84114-2101  
801.538.9191

- 1 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [chdata@utah.gov](mailto:chdata@utah.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 23 December 2009: Called to follow up they don't deal with animals
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 26 March 2010: Sent initial request to participate and questionnaire to Bureau of Epidemiology, director Jennifer Brown, [jenniferbrown@utah.gov](mailto:jenniferbrown@utah.gov), and assistant Tamara Hampton, [thampton@utah.gov](mailto:thampton@utah.gov).

## VERMONT

Vermont Fish & Wildlife Department  
[fwinformation@state.vt.us](mailto:fwinformation@state.vt.us)  
Admin. 802.241.3700

- 15 September 2009: Mailed hardcopy of questionnaire to: Vermont Fish & Wildlife Department, 10 South, 103 South Main Street, Waterbury, VT 05671-0501
- 13 October 2009: Lady on the front desk said they only deal with wildlife and mail goes to mail department where it might have got recycled
- 19 November 2009: David LeCours, Director of Law Enforcement, Vermont Fish & Wildlife, [dlecours@dps.state.vt.us](mailto:dlecours@dps.state.vt.us), 802.241.3727, submitted a completed questionnaire by FedEx

Department of Agriculture, Food, and Markets  
Animal Health Section

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dr. Kristin Haas, Director/State Veterinarian, 802.828.2426, [kristin.haas@state.vt.us](mailto:kristin.haas@state.vt.us)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 13 March 2010: Resent original request to participate and both versions of questionnaire.

Vermont Department of Health  
108 Cherry Street, Burlington, VT 05402  
802.863.7200

- 1 October 2009: Mailed hardcopy of questionnaire to: 108 Cherry Street, Burlington, VT 05402
- 23 October 2009: Called to follow up said Epidemiology department might have got it their number is 802-863-7240
- 12 November 2009: Emailed electronic version of questionnaire to: Bob Johnson [rjohnso@vdh.state.vt.us](mailto:rjohnso@vdh.state.vt.us)
- 13 March 2010: Resent original request to participate and both versions of questionnaire.

## VIRGINIA

Virginia Department of Game and Inland Fisheries  
Richmond Headquarters: Phone: 804.367.1000  
General Information: Phone: 804.367.1000  
[dgifweb@dgif.virginia.gov](mailto:dgifweb@dgif.virginia.gov)

- 15 September 2009: Mailed hardcopy of questionnaire to: Virginia Department of Game and Inland Fisheries, 4010 West Broad Street, Richmond, Virginia 23230
- 22 September 2009: Jaime L. Sajecki, Black Bear Project Leader, 804.367.8001, responded by email; declined to answer, referred to State Health Dept.
- 13 October 2009: Called to follow up: Left message
- 20 October 2009: Jamie Sajecki left voicemail; says she can't help; referred to Health Dept.

- follow up on this

Department of Agriculture and Consumer Services  
Virginia Department of Agriculture and Consumer Services  
102 Governor Street, Richmond, VA 23219  
804.786.0000 operator

- 1 October 2009: Mailed hardcopy of questionnaire to: 102 Governor Street, Richmond, VA 23219
- 23 October 2009: Called to follow up: Department of Agriculture phone 804.786.2042, and their email address is [agribusiness.vdacs@vdacs.virginia.gov](mailto:agribusiness.vdacs@vdacs.virginia.gov)
- 30 October 2009: E-mailed to follow up and check if agency received questionnaire
- 13 March 2010: Resent original request to participate and both versions of questionnaire.

Department of Health  
[Sandra.Price@vdh.virginia.gov](mailto:Sandra.Price@vdh.virginia.gov)

- 1 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Catherine West, 804.864.7001, [Questions@vdh.virginia.gov](mailto:Questions@vdh.virginia.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 20 October 2009: Got an e-mail response from Julia Murphy State Public Health Veterinarian [Julia.Murphy@vdh.virginia.gov](mailto:Julia.Murphy@vdh.virginia.gov), she said she completed the questions that applied to their agency and have passed it along to both game and agriculture authorities for their input. She has not yet heard back from them. When she will have additional information, she will contact us.
- 29 October 2009: received questionnaire responses by email from Julia Murphy, State Public Health Veterinarian, [Julia.Murphy@vdh.virginia.gov](mailto:Julia.Murphy@vdh.virginia.gov)

Richmond Ferret Rescue League  
3019 Hey Rd., Richmond VA.23224; 804-276-3905

- 29 October 2009: received questionnaire responses by email from Marlene Blackburn, Director, [RICHMONDFERT@AOL.COM](mailto:RICHMONDFERT@AOL.COM)

## WASHINGTON

Washington Department of Fish and Wildlife  
2315 N. Discovery Place, Spokane Valley, WA 99216  
Director's Office, 360.902.2200 or 360.902.2947

- 22 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Director's Office, [director@dfw.wa.gov](mailto:director@dfw.wa.gov)
- 28 September 2009: Susan Lasiter, Administrative Assistant Wildlife Program, responded by email: "We regret to inform you that due to budget constraints we are unable to respond to your survey"
- 22 October 2009: Dr. Kristin Mansfield, State Wildlife Veterinarian, Dept. of Fish and Wildlife, 509-892-1001 ext. 326, [kristin.mansfield@dfw.wa.gov](mailto:kristin.mansfield@dfw.wa.gov), responded by email asking for electronic version of the questionnaire; is happy to respond
- 30 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Dr. Kristin Mansfield, State Wildlife Veterinarian, [kristin.mansfield@dfw.wa.gov](mailto:kristin.mansfield@dfw.wa.gov)
- 25 November 2009: Dr. Kristin Mansfield, State Wildlife Veterinarian, 509.892.1001 ext. 326, [kristin.mansfield@dfw.wa.gov](mailto:kristin.mansfield@dfw.wa.gov), submitted responses to the questionnaire by email; Dr. Mansfield also forwarded questionnaire responses from Eric Cummings and Derek Stinson, who are also with DFW.

Department of Agriculture

P.O. Box 42560, Olympia, WA 98504-2560  
Dan Newhouse, Director, 360/902.1887  
Animal Services  
Dr. Leonard Eldridge, State Veterinarian, 360.902.1878

- 1 October 2009: Mailed hardcopy of questionnaire to: Dr. Leonard Eldridge P.O. Box 42560, Olympia, WA 98504-2560
- 23 October 2009: Called to follow up: Lady said she received it but send it to fish and game department since was not sure about lot of questions, convinced her to answer the questions which are applicable to their department so she would like to have email version of questionnaire her email address is [kpsalzgraf@agr.wa.gov](mailto:kpsalzgraf@agr.wa.gov)
- 27 October 2009: Emailed questionnaire to [kpsalzgraf@agr.wa.gov](mailto:kpsalzgraf@agr.wa.gov)
- Email address was wrong so correct email address is [kfsalzgraf@agr.wa.gov](mailto:kfsalzgraf@agr.wa.gov)
- 12 November 2009: Emailed questionnaire to [kfsalzgraf@agr.wa.gov](mailto:kfsalzgraf@agr.wa.gov)
- 18 November 2009: Kerrie Pfalzgraf, Admin. Assistant, Washington State Department of Agriculture, [kpfsalzgraf@agr.wa.gov](mailto:kpfsalzgraf@agr.wa.gov), 360.902.1878, mailed hardcopy responses of the questionnaire to the CSUS Bio Dept.

Washington State Department of Health  
PO BOX 47890, Olympia, Washington 98504-7890  
(360) 236-4501

- 1 October 2009: Mailed hardcopy of questionnaire to: PO BOX 47890, Olympia, Washington 98504-7890
- 23 October 2009: Called to follow up: Nancy said that they don't deal with that it would be State Veterinarian there number is 360-902-1878
- 25 November 2009: Dr. Ron Wohrle, Environmental Health Veterinarian, 360-236-3369, [ron.wohrle@doh.wa.gov](mailto:ron.wohrle@doh.wa.gov), submitted responses to the questionnaire by email forwarded by Dr. Mansfield

## **WASHINGTON DC**

(could not find a wildlife agency in DC)  
(could not find an ag. dept. in DC)

District Department of the Environment  
51 N Street, NE, Sixth Floor, Washington, DC 20002  
202.535.2600

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [ddoe@dc.gov](mailto:ddoe@dc.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 23 December 2009: Called to follow up left message
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 19 March 2010: See below at Department of Health.

Department of Health  
825 North Capitol Street, NE, Washington, DC 20002; 202.442.5955

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [doh@dc.gov](mailto:doh@dc.gov)
- 19 October 2009: E-mailed to follow up and check if agency received questionnaire
- 23 December 2009: Called to follow up transferred to Moli lunaris 202-535-3508, 202-535-1952 left message
- 5 January 2009: Maria Hille, Program Manager, Animal Disease Prevention, 202.535.1952, returned our call and said she would answer questionnaire; a questionnaire was emailed to her at [maria.hille@dc.gov](mailto:maria.hille@dc.gov)
- 19 February 2010: E-mailed to follow up and check if agency received questionnaire
- 13 March 2010: Resent original request to participate and both versions of questionnaire.
- 19 March 2010: Maria Hille Program Manager / Bureau of Community Hygiene/DC Department of Health / Animal Disease Prevention / Government of the District of Columbia responded to email. Said she is going to collaborate

with wildlife staff at the DC Department of the Environment and the veterinarian Zoo staff from the Smithsonian. Will try to get it done in two weeks.

- 16 April 2010: Resend request to participate and questionnaire to Maria Hille at [maria.hille@dc.gov](mailto:maria.hille@dc.gov) to remind her to fill out and send in questionnaire.
- 7 May 2010: Left another message for Maria Hille and resent her response email and original questionnaire.
- 7 May 2010: Received completed electronic questionnaire from Maria Hille, department of health.

## **WEST VIRGINIA**

West Virginia Division of Natural Resources

Administration: 304.558.3315

Wildlife Resources Section: 304.558.2771

- 15 September 2009: Mailed hardcopy of questionnaire to: West Virginia Wildlife Resources Section, 324 Fourth Ave, South Charleston, WV 25303
- 12 October 2009: Christopher Ryan, Head of Research, sent hardcopy responses by FedEx

Department of Agriculture

Animal Health Division

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Gary Kinder, DVM, Acting Director, 304.558.2214, [gkinder@ag.state.wv.us](mailto:gkinder@ag.state.wv.us)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 13 March 2010: Resent original request to participate and both versions of questionnaire.
- 13 March 2010: Sent original request to participate and both versions of questionnaire to Dr. Gary Kinder, State Veterinarian, Animal Health Division, (304) 558-2214, [gkinder@ag.state.wv.us](mailto:gkinder@ag.state.wv.us)

Department of Health and Human Services

State Capitol Complex, Building 3 Room 206, Charleston, WV 25305; 304.558-0684

- 6 October 2009: Mailed hardcopy of questionnaire to: State Capitol Complex, Building 3 Room 206, Charleston, WV 25305
- 23 October 2009: Called to follow up : Carol couldn't remember getting hardcopy would prefer email version of questionnaire her email address is [Carol.I.jackson@wv.gov](mailto:Carol.I.jackson@wv.gov)
- 27 October 2009: Emailed questionnaire to Carol Jackson, [Carol.I.jackson@wv.gov](mailto:Carol.I.jackson@wv.gov)
- 13 March 2010: Resent original request to participate and both versions of questionnaire.

## **WISCONSIN**

Wisconsin Department of Natural Resources

Endangered, Threatened, and Nongame Mammals; 715.762.1363

- 17 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Adrian Wydeven, Conservation Biologist 715.762.1363, [Adrian.Wydeven@Wisconsin.gov](mailto:Adrian.Wydeven@Wisconsin.gov), and Loren Ayers, Small Mammals, Research Scientist, [loren.ayers@wisconsin.gov](mailto:loren.ayers@wisconsin.gov)
- 22 October 2009: Mr. Wydeven sent a response by email; this includes answers from 2 other persons in same Dept.—Thomas VanHarden, Conservation Warden & NR Policy Officer, and Scott Loomans, Wildlife Regulations Policy Expert

Department of Agriculture, Trade & Consumer Protection

Division of Animal Health: 2811 Agriculture Dr., Madison WI 53718; 608.224.4872



- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Ellen McDermott, [Ellen.McDermott@Wisconsin.gov](mailto:Ellen.McDermott@Wisconsin.gov)
- 27 October 2009: E-mailed to follow up and check if received questionnaire
- 27 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Yvonne M. Bellay, DVM, MS [yvonne.bellay@wisconsin.gov](mailto:yvonne.bellay@wisconsin.gov)
- 4 November 2009: Dr. Yvonne Bellay, State Humane Officer/Staff Epidemiologist, Wisconsin Dept. of Agriculture, Trade and Consumer Protection, [yvonne.bellay@wisconsin.gov](mailto:yvonne.bellay@wisconsin.gov), 608.224.4888, mailed hardcopy responses to questionnaire.

#### Department of Health Services

1 West Wilson Street, Room 250, Madison, WI 53702  
608.266.1865

- 5 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [DHSwebmaster@wisconsin.gov](mailto:DHSwebmaster@wisconsin.gov)
- 19 October 2009: Email confirming questionnaire was received: "Thank you for visiting the DHS Web site. Your concern is being forwarded to a DHS representative" by Annette R. Stephens, Office of Operations, [Annette.Stephens@dhs.wisconsin.gov](mailto:Annette.Stephens@dhs.wisconsin.gov), 608-266-1251
- March 2010: Resent original request to participate and both versions of questionnaire.

## WYOMING

Wyoming Game and Fish Department: 307.777.4600 (not helpful; try again)

- 15 September 2009: Mailed hardcopy of questionnaire to: Wyoming Game and Fish Department, 5400 Bishop Boulevard, Cheyenne, WY 82006
- 24 September 2009: Martin Grenier, Nongame Mammal Biologist, 307.332.2688, sent by FedEx a finished hardcopy questionnaire

#### Department of Agriculture

- 25 September 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: Jason Fearneyhough, Director, 307.777.6569, [jfearn@state.wy.us](mailto:jfearn@state.wy.us)
- 27 October 2009: E-mailed to follow up and check if received questionnaire

#### Department of Health

401 Hathaway Building, Cheyenne, WY 82002  
307.777.7656

- 6 October 2009: Mailed hardcopy of questionnaire to: 401 Hathaway Building, Cheyenne, WY 82002
- 20 October 2009: hardcopy mailing returned - postage insufficient; Geo emailed today
- 4 November 2009: Dr. Karl Musgrave, State Public Health Veterinarian, Wyoming Dept. of Health, 307.421.8591, [karl.musgrave@health.wyo.gov](mailto:karl.musgrave@health.wyo.gov), mailed hardcopy responses to questionnaire.

# **Ferret Survey of North American Governmental Agencies Research Project**

## **CORRESPONDENCE LOG – CANADA AGENCIES**

### **Canadian Federal Agencies**

#### **Environment Canada**

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [quebec.scf@ec.gc.ca](mailto:quebec.scf@ec.gc.ca)
- 14 October 2009: Environment Canada's Inquiry Centre responded: "*Environment Canada is responsible for migratory birds and endangered species. As ferrets are not considered species at risk, we would suggest visiting the websites below in the event that they would be interested in taking part of your study: <http://www.ferrets.ca/> and <http://cfhs.ca/athome/ferrets/>.*"

### **Canadian Non-governmental Organizations**

<http://www.ferrets.ca/>

<http://cfhs.ca/athome/ferrets/>

### **Canadian Provincial Agencies**

#### **Alberta**

Sustainable Resource Development  
Dept. of Fish and Wildlife  
Ted Morton, Minister  
1.877.944.0313

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [srd.infocent@gov.ab.ca](mailto:srd.infocent@gov.ab.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

Dept. of Health and Wellness  
Honourable Ron Liepert, Minister  
780.427.3665

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [health.minister@gov.ab.ca](mailto:health.minister@gov.ab.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

Dept. of Agriculture and Rural Development  
Honourable George Groeneveld, Minister  
780.427.2137

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [michael.norris@gov.ab.ca](mailto:michael.norris@gov.ab.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

#### **British Columbia**

Dept. of Biodiversity and Wildlife  
Minister of Agriculture and Lands; Steve Thomson (animal disease control)

250.387.1023

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to:  
[wildlife@victoria1.gov.bc.ca](mailto:wildlife@victoria1.gov.bc.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

British Columbia Dept of Health Services  
Ministry of Health Services  
1515 Blanshard Street  
Victoria BC V8W 3C8  
Minister of Health Services Kevin Falcon  
290.952.1742

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to:  
[HLTH.Health@gems1.gov.bc.ca](mailto:HLTH.Health@gems1.gov.bc.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

Centre for Disease Control  
655 West 12th Avenue  
Vancouver, BC V5Z 4R4

- 17 December 2009: Dr. Brian R. Radke, Public Health Veterinarian, Environmental Health Services Division, , 604.707.2453, [brian.radke@bccdc.ca](mailto:brian.radke@bccdc.ca), submitted questionnaire responses by email

British Columbia Ministry of Environment  
250.387.1187  
Barry Penner, Minister of Environment  
PO Box 9047, STN PROV GOVT, Victoria BC V8W 9E2

Ecosystems Branch  
PO Box 9338 Stn Prov Govt, Victoria, BC V8W 9M1

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to:  
[env.minister@gov.bc.ca](mailto:env.minister@gov.bc.ca)
- 2 December 2009: Eric Lofroth, Mesocarnvore Specialist, 2975 Jutland Road, PO Box 9375, Victoria, BC Canada V8W 9M1, [Eric.Lofroth@gov.bc.ca](mailto:Eric.Lofroth@gov.bc.ca), 250-356-0244, submitted a completed questionnaire by email

## Quebec

Ministere de l'Agriculture, des Pecheries, et de l'Alimentation  
Cabinet du ministre  
200, chemin Sainte-Foy, 12e étage  
Québec G1R 4X6  
Téléphone : 418 380-2525

- 14 December 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to:  
[ministre.mapaq@mapaq.gouv.qc.ca](mailto:ministre.mapaq@mapaq.gouv.qc.ca)

Ministère de la Santé et des Services sociaux  
Téléphone : 418 266-7171

- 14 December 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to:  
[ministre@msss.gouv.qc.ca](mailto:ministre@msss.gouv.qc.ca)

Ministère des Ressources naturelles et de la Faune

- 14 December 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [services.clientele@mrnf.gouv.qc.ca](mailto:services.clientele@mrnf.gouv.qc.ca)

## **Manitoba**

Wildlife Agency?

Dept of Agriculture, Food and Rural Initiatives  
Rosann Wowchuk, Minister  
165 Legislative Building 450 Broadway, Winnipeg, MB R3C 0V8  
204.945.3722

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [minagr@leg.gov.mb.ca](mailto:minagr@leg.gov.mb.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

Dept. of Health  
Theresa Oswald, Minister of Health  
204.945.3731

302 Legislative Building 450 Broadway, Winnipeg, MB R3C 0V8

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [minhlt@leg.gov.mb.ca](mailto:minhlt@leg.gov.mb.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

## **New Brunswick**

Dept. of Natural Resources, Wildlife Division  
Matt Jones, Communications Officer  
Hugh John Flemming Forestry Centre, PO Box 6000 Fredericton, NB E3B 5H1 Canada

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [Matt.jones@gnb.ca](mailto:Matt.jones@gnb.ca)
- 13 October 2009: Dr. Jean-Michel DeVink, 506-453-2440, [ean-michel.devink@gnb.ca](mailto:ean-michel.devink@gnb.ca), submitted responses to the MS Word form by email

Dept of Agriculture and Aquaculture  
Hon. Ronald Ouellette, Minister  
506.453.7170

Agricultural Research Station, PO Box 6000 Fredericton, NB E3B 5H1 Canada

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [DAA-MAA@gnb.ca](mailto:DAA-MAA@gnb.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

Dept of Health  
Hon. Mary Schryer, Minister of Health  
506.457.4800

HSBC Place PO Box 5100, Fredericton, NB E3B 5G8 Canada

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [dh-ms@gnb.ca](mailto:dh-ms@gnb.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

## **Newfoundland and Labrador**

Dept. of Environment and Conservation  
Secretary's email: [bkennedy@gov.nl.ca](mailto:bkennedy@gov.nl.ca)  
Wildlife Headquarters  
John Blake, Director

117 Riverside Drive, P. O. Box 2007, Corner Brook, NL A2H 7S1

- 16 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [johnblake@gov.nl.ca](mailto:johnblake@gov.nl.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

Dept. of Agriculture  
Minister's Office (Headquarters)  
7th Floor, Natural Resources Building, 50 Elizabeth Ave., P.O. Box 8700, St. John's, NL A1B 4J6  
709.729.2920

- 9 October 2009: Mailed hardcopy of questionnaire to: 7th Floor, Natural Resources Building 50 Elizabeth Ave., P.O. Box 8700, St. John's, NL A1B 4J6

Dept of Health  
Hon. Paul Oram, Minister of Health and Community Services  
Confederation Building, 1<sup>st</sup> Floor West Block  
PO Box 8700, St. John's, NL A1B 4J6

- 9 October 2009: Mailed hardcopy of questionnaire to: Confederation Building, 1<sup>st</sup> Floor West Block, PO Box 8700, St. John's, NL A1B 4J6

## **Northwest Territories**

Dept. of Environment and Natural Resources  
Wildlife Section  
Susan Fleck, Director  
867.920.8043

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [Susan\\_fleck@gov.nt.ca](mailto:Susan_fleck@gov.nt.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

Dept of Health and Social Services  
Sandy Lee, Minister  
867.669.2344

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [sandy\\_lee@gov.nt.ca](mailto:sandy_lee@gov.nt.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

## **Nova Scotia**

Dept. of Natural Resources  
Hon. John MacDonell, Minister of Agriculture and Natural Resources  
PO Box 2223 Halifax, Nova Scotia B3J 3C4

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [MIN\\_DAG@gov.ns.ca](mailto:MIN_DAG@gov.ns.ca)
- 14 October 2009: Barbara Hunt, Correspondence Coordinator, Office of the Minister, [MIN\\_DNR@gov.ns.ca](mailto:MIN_DNR@gov.ns.ca), sent an email stating that the request was received and would be given to Minister

Dept. of Natural Resources  
Wildlife Division  
Provincial Building, 136 Exhibition St., Kentville, Nova Scotia, B4N 4E5  
902.679.6061

- 9 October 2009: Mailed hardcopy of questionnaire to: Provincial Building, 136 Exhibition St. Kentville, Nova Scotia, B4N 4E5
- 22 October 2009: Dr. J. Sherman Boates mailed a completed questionnaire to CSUS

Dept of Health  
Hon. Maureen MacDonald, Minister of Health  
902.424.3377  
PO Box 488 Halifax, NS B3J 2R8

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [healmin@gov.ns.ca](mailto:healmin@gov.ns.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

## **Ontario**

Ministry of Agriculture, Food and Rural Affairs  
Leona Dombrowsky, Minister  
519.826.3100  
1 Stone Rd W, Guelph ON N1G4Y2

- 9 October 2009: Mailed hardcopy of questionnaire to: 1 Stone Rd W, Guelph ON N1G4Y2

Dept of Fish and Wildlife  
Deb Stetson, Manager Wildlife Section, 705.755.1925  
300 Water Street PO Box 7000, Peterborough ON K9J8M5

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [deb.stetson@ontario.ca](mailto:deb.stetson@ontario.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

Health and Long-Term Care  
David Caplan, Minister  
416.327.4327  
Member, KIB – DON VALLEY EAST 2062 Sheppard Ave E Toronto ON M2J5B3

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [Dcaplan.mpp.co@liberal.ola.org](mailto:Dcaplan.mpp.co@liberal.ola.org)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

## **Prince Edward Island**

Department of Agriculture  
Hon. George T. Webster, Minister  
902.368.4820  
Island Information Service, PO Box 2000, Charlottetown, PE Canada C1A 7N8

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [gtwebster@gov.pe.ca](mailto:gtwebster@gov.pe.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire



Dept. of Environment, Energy and Forestry  
Forests, Fish and Wildlife  
Kate E. MacQuarrie, Director  
902.368.4705

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [kemacquarrie@gov.pe.ca](mailto:kemacquarrie@gov.pe.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

Department of Health  
Doug W. Currie, Minister of Health  
902.368.4930

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [dwcurrie@gov.pe.ca](mailto:dwcurrie@gov.pe.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

### **Saskatchewan**

Dept of Wildlife  
Liz Quarshie, Deputy Minister  
306.787.2930  
5th Floor - 3211 Albert Street, Regina, SK Canada S4S 5W6  
T5K 2B6

- 9 October 2009: Mailed hardcopy of questionnaire to: 5th Floor - 3211 Albert Street, Regina, SK Canada S4S 5W6 T5K 2B6

Dept of Agriculture  
Abdul Jalil, Agriculture Research Director  
306.787.5960  
Room 125, 3085 Albert Street, Regina, SK S4S 0B1

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [abdul.jalil@gov.sk.ca](mailto:abdul.jalil@gov.sk.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

Dept. of Health  
T.C. Douglas Building, 3475 Albert Street, Regina, Saskatchewan, CANADA S4S 6X6

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to: [info@health.gov.sk.ca](mailto:info@health.gov.sk.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire
- 18 December 2009: the General Inquiries office responded by email, [info@health.gov.sk.ca](mailto:info@health.gov.sk.ca), stating that they would attempt to circulate our questionnaire to other agencies, but had little information to offer

(independent agency)

- 12 January 2010: Dr. Patrick Bardutz, Gardiner Park Animal Hospital, 306.721.1022, [gardparkjoan@sasktel.net](mailto:gardparkjoan@sasktel.net), faxed questionnaire responses to CSUS Bio. Dept.

### **Yukon**

Dept of Environment  
Fish and Wildlife Division  
Hon. Elaine Taylor, Minister

Government of Yukon Box 2703 (V-5), Whitehorse, Yukon, Canada Y1A 2C6  
867.667.5715

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to:  
[fish.wildlife@gov.yk.ca](mailto:fish.wildlife@gov.yk.ca) and [Elaine.taylor@gov.yk.ca](mailto:Elaine.taylor@gov.yk.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

Dept. of Health and Social Services

Hon. Glenn Hart, Minister

Yukon Legislative Assembly, Box 2703, Whitehorse, Yukon Y1A 2C6  
(867) 667-8629

- 10 October 2009: E-mailed electronic versions (PDF, MS Word) of the questionnaire to:  
[glenn.hart@gov.yk.ca](mailto:glenn.hart@gov.yk.ca)
- 14 December 2009: E-mailed to follow up and check if received questionnaire

## **APPENDIX C: QUESTIONNAIRE RESPONSES**

Published separately as electronic files provided on compact disc.

## Exhibit E2 Explanation

Exhibit E-2 provides peer-reviewed research assessing the environmental impact of domesticated ferrets. This evidence directly counters claims that ferrets pose a significant threat to wildlife or ecosystems. The study offers a scientific perspective on ferret behavior, their ability (or lack thereof) to survive in the wild, and their interactions with native species. Including this exhibit strengthens the argument that the prohibition of ferrets in California is not based on sound environmental science but rather on outdated assumptions.

# Impacts of domesticated ferrets upon wildlife, agriculture, and human health in the USA, compiled from state agency surveys and literature review, with special emphasis upon California

June 30, 2022

## REVIEW PAPER

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Published 1 July 2022 • [www.doi.org/10.51492/cfwj.108.13](https://www.doi.org/10.51492/cfwj.108.13)

## Abstract

The pet ferret (*Mustela putorius furo*) is at the center of a controversy over how domesticated carnivores should be regulated and managed, and in general, how the impacts of introduced mammals can be minimized. California is presented as a case study because it contains the largest state population of pet ferrets, is subject to repeated petitions to repeal the ownership ban, and has diverse wildlife communities vulnerable to exotic animal introductions. The impacts of ferrets upon native wildlife and ecosystems, agribusiness, and human health and safety were compiled from a thorough review of the published literature and the analysis of four surveys of U.S. state agencies, including our unpublished survey data. Results highlight two primary concerns: the ferret can easily escape confinement, and could impact native bird populations, as do feral cats; and human safety concerns, especially with infants, because of the proclivity of the ferret to bite. The requirements for introduction and establishment of an exotic animal are discussed in relation to the case studies of feral ferret populations and applicable life history traits. While the pet ferret may lack the genetic rigor and instincts to be an effective predator and invader, the European polecat (*M. p. putorius*) and ferret-polecat hybrids can and do exploit vulnerable ecosystems such as islands. Regulatory strategies and environmental impact mitigation measures are presented: methods for minimizing the risk of release and for quantifying risk/benefits in general; addressing gaps in regulation, enforcement, funding, and information sharing; mitigating human health and safety concerns by mandatory sterilization /vaccination and pet owner education; and improving monitoring of invasive species and adequacy of emergency response and eradication measures.

**Key words:** California, environmental impact, ferret; hybrid, invasive species, *Mustela putorius*

*furo*, pet, polecat

**Citation:** Graening, G. O. 2022. Impacts of domesticated ferrets upon wildlife, agriculture, and human health in the USA, compiled from state agency surveys and literature review, with special emphasis upon California. *California Fish and Wildlife Journal* 108:e13.

**Editor:** Katrina Smith, Wildlife Branch

**Submitted:** 13 December 2021; **Accepted:** 4 April 2022

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**Competing Interests:** The author has not declared any competing interests.

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## Scientific Nomenclature and Regulatory Classification of the Ferret

The taxonomic status of the domesticated ferret (*Mustela putorius furo*) is relevant to discuss because it is at the heart of regulatory arguments over the degree of domestication and any latent ability to revert back to a wild form and cause environmental damage. The domesticated ferret is often cited as having been selectively bred in captivity for over 2 millennia (Thomson 1951; Zeuner 1963; Fox 1988; Anderson 1989; Blandford 1987). The oldest literature references do not properly differentiate ferrets from other mustelids such as polecats and weasels (Owen 1969; Corbet and Southern 1977). The purpose of ancient selective breeding efforts was probably not to create a pet, but a hunting companion, as most early references indicate the use of ferrets to flush out, or “ferret out,” prey from holes or other refugia (Everitt 1897; Camp 1966; Woodford 1967). Ferrets are often cited as deriving from an albinistic polecat (Bissonnette 1950; Hvass 1961; Kowalski 1976; Howes 1980; Lever 1985), but domesticated lineages are often crossed with each other or outbred with wild polecats to artificially select for color, docility, hunting ability, and genetic vigor, or to eradicate diseases from inbreeding depression (Bell 1837; Fennell 1843; Hagedoorn 1954; Mathews 1968; Corbet and Southern 1977). Recent genetic analysis of the entire genus *Mustela* (Davison et al. 1999) demonstrates that the ferret’s origins are obscure and complex.

The taxonomic treatment of domesticated ferrets has varied greatly over the last three centuries, but most authors prefer the trinomen *Mustela putorius furo*, which is often incorrectly attributed to Linnaeus (1758). Linnaeus (1758) recognized the ferret as its own species *Mustela furo*, a taxon distinct enough, he determined, to separate it from its wild ancestor—the polecat—which he named *Mustela putorius*. The validity of the taxa *Mustela putorius* and *M. p. furo* has been challenged, and often recombined or misspelled, and synonyms include the following: *Mustela furio* [sic], *Mustela putorious* [sic]; *Putorius vulgaris*; *Putorius foetidus*, and *Putorius furo* (Bachrach 1930; Cabrera 1930; Corbet and Southern 1977; Blandford 1987). Similarly, the vernacular names of *Mustela putorius sensu lato* and its subspecies are quite varied and include European polecat, western polecat, ffwlbart, fitch, foulmart, and iltis (Bachrach 1930; Thomson 1951; Corbet and Southern 1977). The vernacular names for *M. p. furo* typically differ



from those of the wild polecat, such as domestic ferret, domesticated fitch, and European ferret, but 'ferret' is often synonymized with 'polecat,' which obfuscates the differences between genomes of those populations artificially or naturally selected (Bachrach 1930; Anderson 1989). Such synonymy has also made difficult the determination of the adverse impacts that ferrets alone may have caused upon the environment. Some earlier authors considered the domesticated ferret to be sufficiently divergent from the European polecat and steppe polecat to assign it to the distinct species *Mustela furo* (Linnaeus 1758; Bachrach 1930; Corbet and Southern 1977; Blandford 1987; Poole 1973). In contrast, genetic analysis of *Mustela* by Davison et al. (1999) indicates that interspecific variation was generally too low to properly resolve species-level relationships and their analysis could not resolve whether ferrets were originally domesticated from *M. p. putorius* or *M. eversmannii* (steppe polecats). Interbreeding between mustelid species has been documented (Miller 1933; Blandford 1987; Owen 1969; Corbet and Southern 1977; Fox 1988; Chadwick 1991). Forsyth et al. (2004) describe the combined polecat-ferret taxon (*Mustela putorius sensu lato*) as a spectrum, with the polecat at one end displaying the genotype and phenotype of an untamable animal able to thrive in the wild and colonize suitable habitat, and the ferret at the other end of the spectrum, displaying the opposite attributes. Furthermore, ferrets and polecats cannot be easily differentiated phenotypically; traditional taxonomic characters (pelage color, cranium measurements) are unreliable and sexual dimorphism exists (Ashton and Thomson 1954; Walton 1977; Blandford 1987; King 1990; He et al. 2002). Agency surveys report that a wide variety of taxonomic and vernacular names are used by state agencies to identify ferrets (Jurek and Ryan 1999; Graening et al. 2010; Lepe et al. 2017). These unresolved taxonomy issues pose a challenge to the regulation of ferret importation and ownership as well as the identification of stray or feral ferrets.

In the past century, the regulatory classification of ferrets was an important issue because the regulatory authority of some state agencies depended upon whether the animal was classified as wildlife/exotic animal or a domesticated animal/pet (see review by Herman 2000). With the advent of sterilization techniques and vaccines, as well as selective breeding for docility, most state agencies and non-governmental organizations now recognize the ferret as a pet or domesticated animal. The classification of the ferret in a particular state or municipality is often dictated by its regulatory status. The vast majority of state agencies classify it as a pet or domestic animal, while states that ban ferret ownership (California, Hawaii) label it as a wild or exotic animal (Jurek and Ryan 1999; Graening 2010; Lepe et al. 2017).

The weasel genus *Mustela* originated in Eurasia, and may have colonized North America in the Middle Pleistocene during land connection with Russia (i.e., Beringia); the stoat (*Mustela erminea*) and the black-footed ferret (*Mustela nigripes* *Mustela putorius sensu lato*) is not (Kurtén and Anderson 1980; Anderson 1989; Jameson and Peeters 2004). Other mustelids (e.g., *Martes*, *Lontra*, and *Taxidea*) may have colonized North America as early as the Miocene Epoch (Kurtén and Anderson 1980; Jameson and Peeters 2004).

Ferrets were first imported into North America from Europe in the 19<sup>th</sup> century for use in hunting and pest control and importations continued into the early 20<sup>th</sup> century for fur production (Lantz 1909; Bissonnette 1950; Dolensek and Burn 1976; Fox 1988). In the USA, a ferret breeding industry developed at the beginning of the 20<sup>th</sup> century and displaced importation (Harding 1915). By the mid-20th century, the use of ferrets in hunting declined and cats gradually replaced ferrets as the popular animal companion for rodent control (Kowalski 1976). Since the 1930s, ferrets were bred and used in the laboratory for biomedical research (Besch-Williford 1987). Around the 1970s, ferrets re-emerged as a novel exotic pet, were popularized in the 1990s in cinema, and hundreds of thousands are now bred for the pet trade

(Paisley and Lauer 1988; Graening 2010). Despite numerous accidental and intentional introductions, the ferret is not considered to be one of the naturalized mammals of North America (Banfield 1974; Hall 1981; Lever 1985; Fox 1988; Eisenberg 1989); a few authors include the ferret in the North American fauna based upon incidents of stray ferrets persisting in Arizona and New Mexico (Hoffmeister (1986; Jones et al. 1997; Jones and Schmitt 1997).

## **Censuses of Pet Ferrets**

The enumeration of the pet ferret population in the USA and California is important for several reasons: it provides information about economic impacts, both beneficial and adverse; it may be used to support or refute arguments that ferrets impact the environment; it may be used in risk analyses and cost-benefit analyses; and it is a measure of civil disobedience (i.e. number of Californians ignoring the ferret ban) and indicates the relative need for future licensing, monitoring, or enforcement actions. No scientific census of ferrets has ever been performed in the USA; all existing estimates are based upon opinion or extrapolation of pet owner surveys or ferret product sales. Published estimates for total numbers of pet ferrets in the USA for the last 3 decades range from 275,000 to 10,000,000, but most hover around 1,000,000 (Paisley and Lauer 1988; Wiesser 1991; Jeans 1994; AVMA 2007; Jurek 1998; Boyce et al. 2001; Ball 2002; Nagami 2004; American Pet Products Association, Inc. 2010; Graening 2010). Published estimates for total numbers of pet ferrets in California for the last 3 decades range from 30,000 to 1,000,000, but most cluster around 100,000 (Weiser 1991; Umbach 1997; Jurek 1998; Boyce et al. 2001; Graening 2010). Ferret sales are in the range of 150,000 animals each year (Paul Juszczak, Director of Sales, Marshall Pet Products, personal communication, 2010).

## **Impacts of Domesticated Ferrets Upon Wildlife**

*General impacts of invasive species.*—Impacts from invasive species are second only to habitat destruction in worldwide biodiversity loss (Stein et al. 2000). At least 4,500 exotic species have established free-living populations in the USA, and California experiences a new exotic species introduction at a rate of about every 4 months (U.S. Congress, Office of Technology Assessment 1993; CDFG 2007). In California alone, there are at least 12 exotic mammals that have become naturalized, and environmental impacts are documented (Mooney et al. 1993; CDFG 2007). California, particularly the California Floristic Province, is a global biodiversity hotspot (defined as a megadiverse region under imminent threat of destruction)(Stein et al. 2000). It is generally very difficult to assess the impact of an introduced species on the ecosystem it has invaded (U.S. Congress, Office of Technology Assessment 1993; Parker et al. 1999). In most cases, data are not available to compare communities before and after the invasion (Courchamp et al. 2003).

Islands are particularly sensitive to exotic species invasions for a variety of reasons, including the lack of predators or competitors and the naiveté of prey (Moors 1983; Courchamp et al. (2003). Natural ecosystems of the Hawaiian Islands are particularly vulnerable and have been devastated by introduced species: more than half of Hawai'i's free-living species are non-indigenous (U.S. Congress, Office of Technology Assessment 1993). Atkinson (2001) discusses the concept of "mainland islands", which are intensively managed areas such as nature preserves that are targeted for ecological restoration, including the removal of non-native mammals. Wildlife agency biologists argue that California may function as a mainland island (Jurek 2001); however, California has twenty native species of terrestrial carnivores, half of which are mustelids (Jameson and Peters 2004).

According to Forsyth et al. (2004), the process of biological invasion involves four stages: transport; introduction; establishment; and spread. Various factors increase the probability of establishment of an exotic species: increased number of individuals released and number of release events; the new host habitat more closely matches the invader's native habitat; and more competitive life history traits (Forsyth et al. 2004). The ideal conditions for establishment of a feral ferret population are hypothesized to be: a moderate climate in the introduction area; an abundance of preferred prey (rabbits, rats, etc.); a lack of competitors and predators; and a large population of released ferrets with repeated introductions (Blandford and Walton 1991; Davison et al. 1999). All of the ideal conditions for establishment of a feral ferret population have not yet been met in California; predation and competition from California's wildlife may be important factors that limit the success of the establishment of a feral ferret population.

*Mustela putorius sensu lato* are carnivores and prefer live prey, but can eat carrion and non-meat foods (Blandford 1987; Anderson 1989; Ball 2002). The primary prey items of polecats and ferrets are rabbits and rodents, although ground-nesting birds and eggs are common targets (e.g., Anderson 1989; Alterio and Moller 1997; Clapperton 2001). Feral ferrets are implicated in the decline of seabirds on the Azores archipelago (Pitta Groz et al. 2002) and birds in New Zealand (King 1984b). Thus, escaped feral ferrets could impact California wildlife, especially ground-nesting birds, and islands ecosystems are particularly vulnerable.

*Life history traits of the ideal invader compared to the ferret.*—The characters of a model invasive species include commensal or mutualist relationship with humans; omnivory and ability to live in a wide range of physical environments; relatively long life-span and short reproductive cycle; high genetic variability; and competitive superiority (Ehrlich 1986; Newsome and Noble 1986; Bomford and Hart 1998).

According to r/K-selection life history theory, animals that are r-selected strategists are better suited to colonization (or invasion) of new habitats (MacArthur and Wilson 1967). King and Moors (1979) compared the life histories of various mustelids, and concluded that polecats and feral ferrets were in the middle of the r/K-selection continuum. Ferrets have some, but not all, of the life history traits of an ideal invader species. *M. putorius sensu lato* reach sexual maturity by about six to nine months of age (Mead 1989). The female is polyestrous, and can produce two litters per year; litter size is 2–12 kits (Mead 1989; Seal 1989; Murphy 1989). *M. p. furo* life expectancy is 5–8 years, with some pet ferrets living up to 14 years (Williams 1984; Applegate and Walhout 1998; Boyce et al. 2001; Ball 2002). New Zealand biologists have performed the most extensive studies on population dynamics of ferrets (e.g. Lavers 1973). Byrom (2002) studied the dispersal and survival of juvenile feral ferrets in New Zealand. Clapperton (2001) summarized the population dynamics of feral ferrets, including estimates of mortality, recruitment, and age-specific survivorship.

*New Zealand case study of escaped/feral ferrets establishing in the wild.*— Before human colonization of the islands, New Zealand had only two species of land mammals, both bats, and no predators (Moors 1983). From the mid-19th century to the beginning of the 20th century, mustelid carnivores (weasels, stoats, and ferrets) were introduced to control non-native rabbit populations, and now all of these mustelids are established and widespread (McCann 1956; Cowan 1984; Lever 1985; Wodzicki 1950; King and Moors 1979; King 1990). New Zealand now has the world's largest population of feral ferrets, and along with the other introduced mammalian predators, are causing a decline in indigenous shorebirds and biodiversity in general (King and Moors 1979; Fitzgerald et al. 1984; King 1990; Alterio and Moller 1997; Dowding and Murphy 2001). It should be noted, however, that the term 'ferret' was used

generically, and various authors reported that undomesticated ferrets and polecats were also released into New Zealand (McCann 1956; Roots 1976; Walton 1977; Blandford 1987; King 1984a, 1990). Attempts to eradicate mustelids have been unsuccessful (Wodzicki 1950; King and Moors 1979; Clapperton 2001). Ironically, one of the most effective means of controlling ferret populations in New Zealand is to reduce rabbit populations (Fitzgerald et al. 1984; King 1990; Clapperton 2001). In 2001, the New Zealand Department of Conservation declared ferrets unwanted organisms under the Biosecurity Act. In 2002, the law was strengthened to ban the sale, distribution and breeding of ferrets. Feral, breeding populations of *Mustela putorius sensu lato* have apparently existed in New Zealand for over a century; the exact genetic makeup of these animals is not certain, and may vary by region.

*Australia case study.*— Instances of stray or feral ferrets have apparently occurred in Australia, but there is little evidence of the establishment of any feral breeding population (Forsyth et al. 2004; Markula et al. 2009). An exception may be a breeding population in Tasmania, but this instance appears to be anecdotal or the population extirpated (Bomford and Hart 1998; Markula et al. 2009). Some scientists express a concern over the possible establishment of mustelids in Australia (Bomford and Hart 1998; Forsyth et al. 2004; Markula et al. 2009). Nationally, Australia apparently does not ban the importation or possession of pet ferrets.

*European cases studies.*— Established feral populations of released domesticated ferrets are reported in: the British Isles, especially on smaller islands (Shetland Islands, Isles of Anglesey, Arran, Man, Mull, and Lewis); some Mediterranean islands (Azores, Sardinia, Sicily); and the Netherlands (Roots 1976; Walton 1977; Corbet and Ovenden 1980; Lever 1985; Blandford 1987; Varnham 2005; Buckley and Sleeman 2007). The current status of these populations is not well known, and the distribution of feral ferrets in Europe is sympatric with European polecats and the subspecies may not be distinguishable (Corbet and Ovenden 1980; Davison et al 1999; Anderson 1989).

*United States case studies.*— Ferrets were apparently introduced into the San Juan Archipelago in the mid-20th century, either by purposeful introduction to counter the impacts of introduced rabbits, or by accidental release by hunters during ferreting, or a combination of both (Stevens 1975). There is anecdotal evidence that a feral ferret or polecat population may have persisted for several years on San Juan Island (Stevens 1975, 1979, 1982); the decline of feral ferrets may have coincided with the reduction in rabbit populations. Currently, agency personnel and academic biologists cannot document any ferrets in the San Juan Archipelago (Jurek and Ryan 1999; Graening 2010). Currently, there is no evidence of any feral breeding population of ferrets in the state of Washington, and agency personnel that responded to surveys did not express and serious concern over the possible establishment of ferrets in Washington (Dalquest 1948; Schoen 1972; Larrison 1970; Graening 2010; Lepe et al. 2017).

Instances of stray or feral ferrets have occurred in Alaska, but there is no evidence of the establishment of any feral breeding population (Alaska Epidemiology Office 1986; Jurek and Ryan 1999; Jurek 2001; Graening 2010). Alaska agency personnel had historically expressed concern over the possible establishment of ferrets in their state in the 1980s, but recent communications and surveys indicate that Alaska agency personnel are not as concerned (Graening 2010; Lepe et al. 2017).

Instances of stray or feral ferrets have occurred in New Mexico, including reports of the intentional release of ferrets to control prairie dogs (*Cynomys ludovicianus*) in the 1980s, but there is no evidence of the establishment of any feral breeding population (Findley et al. 1975; Jones and Schmitt 1997; Jurek

and Ryan 1999; Jurek 2001; Graening 2010). New Mexico agency personnel have previously expressed concern over the possible establishment of feral ferret populations in their state in the Jurek and Ryan (1999) agency survey, but this concern was not expressed in the Graening (2010) agency survey.

Instances of stray or feral ferrets may have occurred in Nevada, but there is no evidence of the establishment of any feral breeding population (Hitchcock 1995; Jurek and Ryan 1999; Graening 2010). Nevada agency personnel have previously expressed concern over the possible establishment of ferrets in their state (Jurek and Ryan 1999), but this concern was not expressed concern in the Graening (2010) agency survey.

Instances of stray or feral ferrets have occurred in Arizona, but there is no evidence of the establishment of any feral breeding population (Hoffmeister 1986; Jurek and Ryan 1999; Graening 2010). Arizona agency personnel have previously expressed concern over the possible establishment of ferrets in their state (Jurek and Ryan 1999), but this concern was not expressed in the Graening (2010) survey and Arizona state agencies did not respond to the Lepe et al. 2017 survey.

Instances of stray or feral ferrets have occurred in Florida, but there is no evidence of the establishment of any feral breeding population (Layne 1997; Florida Fish and Wildlife Conservation Commission 2010; Graening 2010).

Instances of stray or feral ferrets have occurred in California, but there is no evidence of the establishment of any feral breeding population (Stephens 1906; Ingles 1947, 1965; Constantine and Kizer 1988; Constantine 1986; Laudenslayer et al. 1991; Gustaitis and McGrath 1992; Hitchcock 1994; Jurek and Ryan 1999; Jurek 2001).

*Reports of impacts upon wildlife from state agency surveys.*—The state agency responses to the 1987–1989 survey performed by pro-ferret groups revealed no indication of breeding populations of feral ferrets, except for New Mexico, which suspected wild ferret breeding populations existed in the past (Californians for Ferret Legalization 2000a). However, some wildlife agencies reported instances of stray ferrets and many agencies reported a data deficiency. A few wildlife agencies expressed concern about potential impacts from feral ferrets (Californians for Ferret Legalization 2000a; Jurek 2001). In the 1996–1997 survey performed by California Department of Fish and Game staff, five states reported free-living individual ferrets as having survived more than a few days in the wild (Jurek and Ryan 1999). Alaska, New Mexico, and Washington reported suspected wild ferret breeding populations to exist in the past. Most states reported data deficiencies, and no state reported indifference to the threats posed by an established breeding population (Jurek and Ryan 1999). In the 2009–2010 survey performed by biologists at California State University, Sacramento (CSUS), 12 states reported instances of stray ferrets, but no state agency reported the current existence of a feral ferret breeding population, with the exception of Washington, which reported the historic existence of breeding populations on the San Juan Islands (Graening 2010). Most states reported data deficiencies. Eight State agencies estimated instances of ferrets killing or harassing wildlife in the range of 1 to 100 per year. Only California and Hawai'i expressed serious concern regarding the potential for a breeding population to impact wildlife (Graening 2010). In the 2016–2017 survey performed by a biological consulting firm, about half of states reported rare or sporadic instances of stray ferrets, but no state agency reported the existence of a current feral ferret breeding population or any significant impacts upon wildlife (Lepe et al. 2017). Most state agencies did not express severe concern about feral ferrets when compared to the impacts of feral

cats and dogs upon wildlife and human safety (Lepe et al. 2017).

## Impacts of Domesticated Ferrets Upon Agriculture

*Reports of impacts upon agriculture from literature.*—Smallwood and Salmon (1992) provided a literature review of the impact of exotic species upon livestock. Polecats and feral ferrets are known to be highly destructive of poultry and other confined livestock (Bachrach 1930; Roots 1976; Blandford 1987; Lewington 1988; Nagami 2004; Markula et al. 2009). A bulletin by the U.S. Department of Agriculture (Lantz 1909) stated that lost ferrets may “...adapt themselves to wild conditions and become a pest by preying upon poultry and birds.” The California Department of Health Services stated concerns about the ferret’s impact upon poultry, rabbits, and other small livestock (Hitchcock 1994). In 2003, the California Waterfowl Association strongly opposed California Senate Bill SB89 (which would legalize ferret ownership), writing that: “...legal ownership of ferrets in California will result in the establishment of healthy feral populations of this exotic, predatory species causing significant negative environmental impacts on our native fauna, particularly waterfowl and ground-nesting birds.” The Audubon Society and Sierra Club have opposed ferret legalization because of the threat to wildlife (Martindale 2016). In 1994, the California Farm Bureau wrote to the California State Assembly that they opposed Assembly Bill 2497 (which would legalize ferret ownership), stating: “We believe the temperate climate and diversity of our natural and agricultural environments could result in serious unintended consequences to our wildlife and some domestic animals. Some poultry producers, for example, could experience severe flock depredation. Moreover, threatened or endangered birds and small mammals could also fall victim to the ferret.” Escaped, stray, or feral ferrets also have the potential to vector diseases to livestock. In particular, ferrets may serve as a reservoir, or vector, of bovine tuberculosis (*Mycobacterium bovis*) (Smith et al. 1995; Clapperton 2001; Byrom 2002). Clapperton (2001) discussed potential beneficial impacts of feral ferrets upon wildlife and agricultural interest, primarily the control of nuisance rabbits. Similar to cats, ferrets may be effective in controlling rats and other pest populations in urban or suburban environments.

The literature documents that ferrets may have impacted European poultry production, especially in the late 19th and early 20th century. The literature is largely devoid of any instances of ferrets impacting agricultural resources in the USA. The USA has, for the most part, phased out household poultry and egg production and now relies almost exclusively on commercial facilities (confined animal feeding operations); these facilities are better protected from predators than traditional domestic hen houses and coops.

*Reports of impacts upon agriculture from state agency surveys.*—In the 1987–1989 survey (Californians for Ferret Legalization 2000b), the vast majority of state agricultural agencies reported no adverse effects from ferrets upon their agricultural industries. However, some agencies reported data deficiencies and some agencies expressed concern about impacts from ferrets, but these concerns pertained primarily to human health and safety. The Jurek and Ryan (1999) survey and the Lepe et al. (2017) survey did not investigate agricultural impacts.

In the Graening (2010) agency survey ([Appendix I \(PDF\)](#)), eight states gave estimates of ferrets killing or harassing livestock in the range of 1 to 10 instances per year, but 28 states reported a data deficiency. No responding state agricultural department personnel, including California’s, indicated any serious concern about ferrets impacting agricultural resources in their State (Graening 2010).



# Impacts of Domesticated Ferrets Upon Human Health and Safety

*Disease transmission.*—Rabies (*Lyssavirus*) and canine distemper (Paramyxoviridae) are rare in ferrets now that effective vaccines are available, and medical and veterinarian communities agree that all pet ferrets should be vaccinated for rabies and distemper (Ball 2002, 2006; Rupprecht and Gibbons 2004; National Association of State Public Health Veterinarians, Inc. 2008). The Centers for Disease Control and Prevention stated that currently in the USA, human rabies is a rare disease and is relegated largely to non-pet vectors (Rupprecht et al. 1996).

*Aggression towards humans.*—Although the modern ferret has been selectively bred for docility, ferrets still have a propensity to bite humans (Lewington 1988; Jeans 1994; Boyce et al. 2001; Childs 1989; Schilling 2007). Such biting can range from playful mouthing and nips to a hard bite with clamped jaw. Aggression, fear, hunger, excitement, and play motivate the domestic ferret to bite, and these emotions can be difficult to differentiate (Morton and Morton 1995; Boyce et al. 2001; Ball 2002). Occasionally, ferrets attack humans viciously; a common target is the unsupervised infant (Fennell 1843; Apfelbach 1978a; Marcuse 1987; Applegate and Walhout 1998; Nagami 2004). Many state agencies do not adequately or regularly track cases of ferret attacks (Hitchcock 1994; Applegate and Walhout 1998). State agency survey responses indicated a general data deficiency, but about half of states reported or estimated ferret attacks at a range of several per year to hundreds per year (Graening 2010). In municipalities where ferret ownership is illegal, ferret attacks are under-reported. Constantine and Kizer (1988) estimated that the rate of ferret attacks in California were 1 attack per 1 million residents per year. State agencies and anti-ferret groups often cite these attack cases as proof that ferrets are not appropriate pets and as compelling reasons to prohibit ferret ownership. Pro-ferret groups counter that serious injuries and fatalities resulting from ferret attacks are extremely rare, and should not serve as the basis for regulatory decisions. Pro-ferret groups often make the argument that dogs and cats attack people much more often than do ferrets, yet dogs and cats are legal to own and bite risks are tolerated (Herman 2000; Sacks et al. 2000). Bites from small animals such as ferrets represent only a small proportion of the total number of animal bites per year in the United States (Garth et al. 2009).

## Risk Assessment, Cost/Benefit Analysis, and Environmental Impact Assessment

*Risk assessment and cost/benefit analysis.*—A research study (i.e., a controlled experiment or pilot study) could be performed that investigated the potential for pet ferrets to revert to a feral condition and survive in the wild; most authors envision fencing pet ferrets in large enclosures in the wild and determining if ferrets can survive and breed using the available wildlife and in various representative climates (Hunt 1986; Nelms 1993; Umbach 1997). The California Game and Fish Commission (2005) requires an initial experimental introduction, such as an introduction into a confined area or the introduction of sterile individuals, before a non-native species can be de-regulated in California. Because of the possibility that hybrids or polecats could be imported into California, the study may need to analyze polecats and hybrids as well.

Another approach would be to use a predictive model to determine if escaped ferrets had the potential to

establish feral breeding populations, or to perform a cost-benefit analysis that weighed the relative costs of legalization (cost of licensing, regulating, and monitoring, and impacts to wildlife or environment, etc.) to the benefits (license program and pet industry revenue, increases in numbers of vaccinated ferrets, etc.). Bomford (1991, 2006) and Bomford and Hart (1998) created a risk assessment model that employed a cost-benefit analysis to the decision of whether or not to allow introduction of an exotic vertebrate. Forsyth et al. (2004) refined their predictive model. Forsythe et al. (2004) developed a computer model to analyze the success or failure of vertebrate introductions into Australia. They determined that species were more likely to successfully establish where they had wide climate tolerance or that the climate of their native range matched that of Australia, where they had been successfully introduced elsewhere, where more effort had been put into their introduction, and where the body size was small and reproduction rates fast. Smallwood and Salmon (1992) provided a review of the literature on the impact of exotic species upon native wildlife and then created a rating system and applied it to species of concern in California; they rated the European ferret as highly invasive, but empirical data were lacking (Smallwood and Salmon 1992).

The U.S. Congress, Office of Technology Assessment (1993) discussed the general costs and benefits of non-indigenous species upon economies and environments and the process and efficacy for risk assessment and cost-benefit analysis. Potential beneficial impacts from ferret legalization include: the generation of licensing program revenues (assuming revenues exceeded the cost of running the licensing program); elimination of costs associated with enforcing a ban on ferret possession; economic stimulus of the pet trade, pet supply, and veterinarian industries (but most states, including California, do not currently interfere with the sale of ferret-related pet products or medicinal care); and increased compliance with vaccination and sterilization of pet ferrets. Clapperton (2001) discussed potential beneficial impacts of feral ferrets upon wildlife and agricultural interest, primarily the control of nuisance rabbits.

Potential adverse impacts from ferret legalization include: the cost of running a licensing program; increased costs for animal control staffing and animal shelters; an increase in cases of attacks on humans; the destruction of poultry or other small, confined livestock by stray or feral ferrets; and the establishment of feral breeding populations and impacts to wildlife and associated control costs. The U.S. Congress, Office of Technology Assessment (1993) found that the USA spends billions of dollars trying to repair the damage of harmful exotic species.

*Risk of inadvertent release.*— Ferrets have a natural tendency to explore, to escape confinement, and to cache objects of interest—hence their Latin name “*furo*” which translates to “thief.” Ferrets are often called “animal Houdinis” or escape artists (Lewington 1988; Wellstead 1981; Boyce et al. 2001). Most ferret owners, including laboratory animal keepers, veterinarians, and pro-ferret authors, report that it is difficult to confine ferrets and to retrieve escapees (Mathews 1968, 1971; Howes 1980; Williams 1984; Morton and Morton 1985; Scharmann and Wolff 1987; Jeans 1994; Schilling 2007). Some ferrets are apparently abandoned and set free by pet owners that no longer want them (Williams 1984; Constantine and Kizer 1988; Jurek 2001; Schilling 2007). American Pet Products Association, Inc. (2010) lists various categories of where pet ferrets were obtained in 2008; while the majority (73%) were obtained from pet stores, 2% were “caught outside.” The literature indicates that ferrets can, and do, escape confinement, and that accidental or intentional releases of ferrets into the environment do occur. In the Jurek and Ryan (1999) agency survey, more than half of states reported instances of stray ferrets in urban areas: 28 states reported instances to be ‘rare’ or ‘sporadic’, and New Mexico and Georgia reported stray ferrets to be ‘Common’ and ‘Frequent’, respectively. In the Graening (2010) agency survey, 12 states reported

instances of stray ferrets. In the Lepe et al. (2017) agency survey, about half of states reported rare or sporadic instances of stray ferrets. It does not appear to be possible to completely eliminate the risk of ferrets escaping confinement in California. In California, stray ferrets are found every year (Jurek 2001).

*Risk of ferrets establishing a breeding population.*—The case studies of feral ferrets in New Zealand and other parts of the world demonstrate that mustelids within the polecat-ferret spectrum (*M. putorius sensu lato*) can establish breeding populations and adversely impact wildlife. It is not clear whether the American lineage of pet ferret can be directly compared to these feral ferret populations or whether they can be assigned the same risk of establishment and adverse impact upon the environment. Analysis of these case studies is important because both pro-ferret groups and wildlife agencies have used these case studies as arguments for the inability or proclivity (respectively), of ferrets to revert to a feral condition and establish breeding populations (Hunt 1986; Umbach 1997).

Since pet ferrets have been selectively bred in captivity for many decades, with emphases on pelage color, morphological neoteny, and docility, the resulting altered phenotype and restricted genotype may limit the capacity of domesticated ferrets to survive, hunt, and breed in the feral state (Poole 1972; Blandford 1987; Gustafson et al. 2017). The popular literature is full of statements that pet ferrets have lost their instincts to hunt, eschew live prey, and would not be able to survive long without human support (e.g. Weiser 1991; Morton and Morton 1995; Schilling 2007). Ferrets are often described as being intolerant of temperature extremes (Bell 1837; Harding 1915; Lewington 1988). But there are some scientific studies that indicate that hunting and courting behavior must be learned in the wild. Acoustical, optical, and olfactory cues are important for hunting, and ferrets and polecats must learn these cues *in feras* and imprint these cues at an early age (Apfelbach and Wester 1977; Apfelbach 1978a,b; Apfelbach 1986; Blandford 1987). Live prey are killed with a neck bite, which is instinctive but must be perfected with practice (Blandford 1987). A non-fatal neck clasp is necessary to copulate, but this bite in the nape must be learned, usually in sibling play (Blandford 1987). Black-footed ferrets which were raised in captivity and then released into their native range have limited reproductive success, may not develop critical behavioral skills, and may be more prone to predation (Chadwick 1991; Godbey and Biggins 1994; Russell et al. 1994). Ferrets and polecats are subject to predation by birds of prey and larger carnivorous mammals (Markula et al. 2009). Ferrets and polecats do have some defense mechanisms: the expression of noxious odors from scent glands; sharp teeth to bite the nose and face of an attacker; and dense fur and loose skin that discourage successful jaw clamps (Poole 1970; Blandford 1987)

The pet ferret is also subject to a variety of diseases and disorders, making this pet expensive to own and shortening its average lifespan: distemper, rabies, parasites, bone marrow suppression, insulinoma, adrenal gland disease, diarrhea, colds, flus, ringworm, heat stroke, urinary stones, and cardiomyopathy (Ryland and Gorham 1978; Fox 1988; Duda 2003; Schilling 2007). Hoppes (2010) states that although the life span of pet ferrets is 8 to 10 years, most veterinarians consider ferrets to be geriatric as early as 3 years of age because they already display signs of aging such as nutritional issues and geriatric diseases. Gustafson et al. (2017) recommended outbreeding of ferrets and crossing with populations from separate continents to restore genetic vigor.

Female ferrets (jills) have certain physiological challenges relating to their reproductive system. Jills are induced ovulators and remain in estrus until pregnant; persistent estrus beyond a few months is often fatal due to elevated estrogen levels, which can cause bone marrow depression (Bernard et al. 1983). Jills with prolonged estrus may die of thrombocytopenia, hemorrhaging, severe aplastic anemia, or infections induced by leukopenia (Hart 1987; Ball 2002).

*Environmental Impact Assessment.*— In Jurek and Ryan (1999)’s survey, respondents did not indicate that any state agency prepared an environmental impact report during a ferret legalization or regulation action. The Graening (2010) survey produced slightly different results: Washington District of Columbia and Hawai’i used an environmental impact review during their regulatory actions on ferret ownership (Graening 2010). An environmental impact report would need to be prepared before the California Fish and Game Commission would remove an animal from the Fish and Game Code Section 671 restricted animal list (Fischer, CFGC, personal communication, 2009). This is because removal is a rulemaking action, and as such, would trigger compliance with the California Environmental Quality Act (14 CCR, §15000 et seq.), because of statements made by Governor Schwarzenegger in 2004, and because the action is regulated by the Commission’s 2005 Miscellaneous Policy: Introduction of Non-native Species.

## **Regulatory Strategies and Environmental Impact Mitigation Measures**

*Regulatory strategies.*— The U.S. Congress, Office of Technology Assessment (1993) discussed all of the policy options generally available to agencies to control non-indigenous species, primarily: more stringent policies; better screening of plants and animals at ports of entry; improved surveillance and emergency responses; increasing fees and other funding; increasing accountability; environmental education; and addressing gaps in regulation and in information. There is little consensus among states as to the regulatory status of ferrets, and the state agency surveys indicate that many states do not regulate ferrets at all (Ryan and Jurek 1999; Graening 2010; Lepe et al. 2017). Only two states (California and Hawaii) ban importation and possession. An increasing number of states and municipalities are now regulating ferrets as a pet similar to dogs and cats.

*Minimizing risk of release.*— Various mechanisms are available to minimize the risk of release of ferrets and other non-native carnivores into the environment. The most immediate tool is regulatory. However, in the Graening (2010) survey, 25 states and Washington, D.C. responded that they have no regulations against release of ferrets from captivity. California Fish and Game Code (14 CCR, § 671.6) prohibits the release of captive wild/exotic animals, and all states and municipalities should enact similar prohibitions to protect their native wildlife. The use of ferrets in hunting represents a direct mechanism of introduction into the environment; at least 22 States prohibit use of ferrets for hunting (Jurek and Ryan 1999). An extensive network of shelters and communication systems could be established to handle unwanted or abandoned ferrets. A public outreach/education program could be implemented to disseminate information about the disposition, needs, and proper care of ferrets, as well as the environmental impacts of releasing mustelids into the wild.

Mandatory sterilization of ferrets is common in the pet industry. Sterilization of ferrets is recommended by veterinarians to avoid endocrine diseases and to reduce musky odors (Williams 1984; Ball 2002). While sterilized individuals could still prey upon wildlife, they could not establish breeding populations. While ferrets available for purchase through the pet trade may not possess the necessary traits to become an invasive species, polecat-ferret hybrids and European polecats likely have these necessary traits. Like wolf-dog hybrids, some ferret owners may wish to have a more exotic and charismatic animal than the common pet ferret stock produced by breeders such as Marshall Farms. Polecat-ferret hybrids are advertised for sale on various Internet websites, and the merit of owning a hybrid is discussed in ferret-ownership manuals (e.g., Schilling 2007). Non-indigenous hybrids represent particular management challenges: wolf-dog hybrids, for example, are dangerous to humans and obstruct recovery

of endangered wolves in the wild (U.S. Congress, Office of Technology Assessment 1993).

A licensing and compliance program could be established in each state. Punitive measures could be established to discourage the importation or sale of fertile ferrets, hybrids, or polecats, or the establishment of illegal breeding facilities. The compliance program may need to include scientific training to identify different species of mustelids, especially those specimens within the ferret-polecat spectrum. Phillips and Shimbo (1990) give instances of CDFW game wardens mistaking native weasels for ferrets. However, California agency personnel have not been convinced that regulation and enforcement are sufficient to protect California's wildlife communities from the establishment of a feral ferret breeding population (Jurek 2001; Steele, pers. comm. 2010). Even with a ban, California has not been able to stop the illegal importation of ferrets and now California has the largest populations of pet ferrets in the USA.

*Health and safety.*—Serious ferret attacks appear to be rare and to be confined to those humans that cannot defend themselves against a small animal, which for the most part, consists of infants and small children, but may also include the elderly and the disabled. Mandatory warning labels should accompany ferrets offered for sale, and states such as South Carolina require this by law. Other mitigation measures include public outreach and the ban of ferrets from homes with infants, elderly, or the disabled, and the euthanization of ferrets proven to cause serious injury. The vaccination of ferrets against rabies and distemper should be made mandatory, and many states have such regulations. With the implementation of mitigation measures, the health and safety risks can be significantly reduced.

*Monitoring invasions and emergency response.*— The various surveys of state agencies reveal a major data deficiency in the enumeration of stray and feral mustelids, and non-native wildlife in general, in the USA. In the Jurek and Ryan (1999) agency survey, 43 states responded that no effort had been made to assess the status of ferrets in the wild, and 34 states responded that it was '*not considered to be important*' to do such an assessment. The few states that did assess feral ferrets did so by '*opportunistic documentation*' and not by '*concerted surveys*.' In the Graening (2010) survey, most state agency personnel responded "*Don't know*" when asked about ferrets impacting wildlife or the existence of stray or feral ferrets in their states; 41 state agencies indicated that censusing stray or feral ferrets was not important. The primary tools available to detect introductions of animals are visual inspections by biologists, traps, and information collection and dissemination (U.S. Congress, Office of Technology Assessment 1993).

Eradication of an invasive species is technically feasible but complicated, costly, and subject to public opposition (U.S. Congress, Office of Technology Assessment 1993). Agencies should establish a program for elimination or control of an established feral ferret population or any other introduced species. Control measures consist of: trapping, poison bait, biological control agents, and habitat or behavior modification, but no measures have completely eradicated ferrets from New Zealand (Clapperton 2001; IUCN 2010). The primary biological control agent currently is canine distemper: the case fatality rate approaches 100% for ferrets (Williams 2010). In the Jurek and Ryan (1999) agency survey, no state wildlife agency marked the option that an established breeding population '*would not be a serious concern*,' and 48 states responded that some form of control action would be taken upon discovery of an established breeding population. Yet in the Graening (2010) agency survey, 13 state agencies indicated that no action would be taken upon discovery of stray or feral ferrets; the remaining states responded that some action would be taken. Surprisingly, 10 states responded that no action would be taken upon discovery of an established breeding population of domesticated ferrets (Graening 2010). In the four USA

agency surveys performed over four decades, there appears to be a temporal trend of decreasing concern over the risk and impact of ferrets being released into the environment. While feral ferrets may not be the greatest threat to wildlife in their jurisdictions, state agencies should not become complacent to the risks of introductions of non-native mammals, which continue to wreak havoc among native wildlife communities (Stein et al. 2000). Herman (2000) makes the argument that any control measures implemented upon feral ferrets must also focus on feral cats because of their well-documented destruction of bird populations.

*Requirements for legalizing ferret ownership in California.*—The history of regulations and policies in California pertaining to ferrets is presented in [Appendix II \(PDF\)](#). There are two basic paths to the legalization of ferrets in California—enact legislation or change state policy (Umbach 1997; Fischer, CDFG, personal communication, 2009). Legal analysts have proposed the following requirements for legislation (in contrast to unrestricted ownership or continued prohibition): sale only through licensed breeders or animal welfare agencies; vaccination against rabies and other ferret diseases; spaying/neutering before sale; and a public education program to inform prospective ferret owners about the appropriate circumstances for ferret ownership (Umbach 1997; Herman 2000). Various California legislators and agency personnel have criticized attempts to legalize ferret ownership through the legislative process because it bypasses the need for environmental impact review, which is required by California Environmental Quality Act for non-legislative decisions by state agencies. To legalize the importation and possession of ferrets in California by a policy change, the California Fish and Game Commission would need to change the status of the ferret by a majority vote at a Commission meeting, and then Fish and Game Code Section 2118 would be changed to include the ferret as an exception to the wild animals regulated under Section 2116. The California Fish and Game Commission would first require adherence to its 2005 policy document “Miscellaneous Policies: Introduction of Non-Native Species” before ferrets are legalized in California, which requires careful evaluation of the potential impacts of introduction, including the species’ ability to disperse outside the introduction area, and an initial experimental introduction into a confined area, or the introduction only of sterile individuals (Fischer, CFGC, personal communication, 2009). Additional, the Draft and Final Environmental Impact Report would need to demonstrate that any significant impacts can be mitigated to a less-than-significant level, or the Lead Agency would need to file a Statement of Overriding Considerations which determines that benefits to the public outweigh unmitigable environmental impacts. CDFW is likely to impose restrictions on ferret ownership, such as: the importation of only sterilized ferrets and the exclusion of polecat-ferret hybrids or polecats; a ban on breeding of ferrets in California; prohibition of release of ferrets into the wild; and prohibition of ferrets on all of California’s islands, which are sensitive to exotic mammal introductions.

## Acknowledgments

David Kiene (Staff Counsel, Office of General Counsel, CDFW) and Jon K. Fischer (Deputy Executive Director-Regulations and Policy, California Fish and Game Commission) were helpful in elucidating California state policy regarding ferrets. We thank Eric Loft (Wildlife Branch Chief, CDFW) for the appointment of a staff liaison (Dale Steele) during the initiation of our state agency survey on the impacts of domesticated ferrets. Dale Steele (Program Manager, Species Conservation & Recovery Program, CDFW) provided access to CDFW’s extensive collection of files and documents on ferrets (primarily from Ron Jurek’s work) and Steele received copies of all of our state agency survey response data. CSUS Department of Biological Sciences graduate students Navneet Shah and Angela de Palma-Dow assisted in the literature review and the administration of the state agency survey and the



tabulation and database entry of the questionnaire responses. We are grateful to Jack Smith and Astra Gleason (Interlibrary Services, CSUS Library) for the search and acquisition of numerous obscure texts. We are also indebted to the many agency personnel who responded to data requests and who completed the survey.

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## Exhibit F Explanation

Exhibit F provides an overview of ferret regulations across the United States, showing that ferrets are legal in 48 states, with only California and Hawaii maintaining an outright ban. This widespread acceptance of ferrets as domesticated pets underscores that California's ban is an outlier and is not supported by national trends or scientific evidence. The exhibit further highlights that even in jurisdictions with regulations, the approach is typically to manage ferrets through licensing and vaccination requirements rather than prohibition. This supports the argument that California's continued ban is arbitrary, unnecessary, and inconsistent with national standards.

# Are Ferrets Banned in Your Country?

TANYA HUFFMAN • UPDATED: APR 7, 2023 4:14 AM EDT

## Why Are Ferrets Banned in Some Areas?

It is believed that most domesticated ferrets came from the polecat in Western and Eastern Europe. Therefore, they are not native to many other countries. Canada has a native species—the black-footed ferret—but these were not the type that became domesticated as pets.

Since domesticated ferrets were imported to most countries, they may be seen as pests. Unfortunately, many people would set them free, and in some areas, ferrets overpopulated. It is because of this that some areas decided that banning ferrets was the best option.

Other areas and cities feel that these are exotic pets that are potentially harmful and vicious. This is a misunderstanding of ferret behaviour. Yes, ferrets can bite, but so do cats and dogs. Many people have come together and are working on having these laws changed; they are hoping to educate people about ferrets.

## Are Ferrets Exotic Pets?

Even though they are easily available, ferrets are [considered exotic pets](#). An animal is considered exotic if they are not native to the location—regardless of if they have been born and raised in captivity. However, the term is used loosely, as even some native species are considered exotic. The ferret has become a very popular pet for many people, but now countries, states and provinces feel that they shouldn't be kept as pets.

Pet ferrets can be found all over the world, but it is important to know whether you can legally keep them or not. This is an overview of some countries' laws, but please check your local laws before getting your fuzzy little friend.

## United States

In the United States, each state is allowed to govern its own laws about owning a ferret. The regulations are quite varied across all the states. These can range from no regulations to vaccine requirements to straight-up bans.

Keep in mind that just because there are no regulations on ferrets in some states, they will likely still have regulations on cats, dogs and other pets.

Finally, New York City has banned ferrets as pets, even though New York allows them.

## Ferret Laws and Regulations by State

| No Regulations | Minor Regulations | Banned               |
|----------------|-------------------|----------------------|
| Alabama        | Colorado          | California           |
| Alaska         | Florida           | District of Columbia |
| Arizona        | Georgia           | Hawaii               |
| Arkansas       | Idaho             |                      |
| Connecticut    | Illinois          |                      |
| Delaware       | Indiana           |                      |
| Louisiana      | Iowa              |                      |
| Mississippi    | Kansas            |                      |
| Missouri       | Kentucky          |                      |
| Montana        | Maine             |                      |
| New Mexico     | Maryland          |                      |
| North Carolina | Massachusetts     |                      |

*This information is current as of 2021. It's always important to check with your city and state before making a ferret purchase.*

| No Regulations | Minor Regulations                                       | Banned |
|----------------|---------------------------------------------------------|--------|
| North Dakota   | Michigan                                                |        |
| Oregon         | Minnesota                                               |        |
| Pennsylvania   | Nebraska                                                |        |
| South Carolina | Nevada .                                                |        |
| Tennessee      | New Hampshire                                           |        |
| West Virgina   | New York (excluding NYC, which has banned them as pets) |        |
|                | Ohio                                                    |        |
|                | Oklahoma                                                |        |
|                | Rhode Island                                            |        |
|                | South Dakota                                            |        |
|                | Utah                                                    |        |
|                | Vermont                                                 |        |
|                | Virginia                                                |        |
|                | Washington                                              |        |
|                | Wisconsin                                               |        |
|                | Wyoming                                                 |        |

## Australia and New Zealand



The ferret is not native to Australia and New Zealand, so their regulations are tight. Locations that allow ferrets have strict licensing requirements.

New Zealand is a bit different. It is now illegal to sell, buy or breed ferrets there. However, individuals who had ferrets before these laws went into place in 2002 were allowed to keep them. In addition, a select group of people is given a special permit that [allows them to keep pet ferrets](#) for hunting rabbits.

**Recommended**  
**60 Cute and Funny  
Ferret Names**  
  
**APR 8, 2023 1:23 AM EDT**

| Banned             | Minor Regulations            |
|--------------------|------------------------------|
| Queensland         | Victoria                     |
| Northern Territory | New South Wales              |
| Western Australia  | Australian Capital Territory |
| New Zealand        |                              |

## Around the World

It can be tough to find where ferrets are allowed in other countries. From my current research, I've been able to make this list of where ferrets are allowed:

- Canada
- Germany
- Hungary
- Japan
- Peru
- Singapore

- United Kingdom
- Venezuela

Good places to get more information about ferrets in your area are your local government and bylaw offices or your local SPCA/animal rescue. These places should have the latest information or be able to point you in the right direction.

## Want to Help Legalize Ferrets?

- [Ferret Organizations & Shelters](#)  
Index of ferret clubs, shelters, and other organizations in the US and elsewhere.
- [Legalize Ferrets in California](#)  
Want to help get Ferrets legalized in California? Check out information here.

## Sources

- [Nature Canada: Black-Footed Ferret](#)
- [Facts About Ferrets](#)

*This article is accurate and true to the best of the author's knowledge. It is not meant to substitute for diagnosis, prognosis, treatment, prescription, or formal and individualized advice from a veterinary medical professional. Animals exhibiting signs and symptoms of distress should be seen by a veterinarian immediately.*

## Comments

**Cats** on October 27, 2019:

I don't see how they justify banning ferrets, but not cats that do more damage to wildlife.

**ferret** on October 23, 2019:

ferret

**Adrian** on May 17, 2019:

I LOVE FERRETS

**Ethel Smith** from Kingston-Upon-Hull on October 15, 2018:

Interesting. As I am in the U.K. I had not realised ferrets were banned in some places.

## Exhibit G Explanation

Exhibit G provides evidence that despite decades of domestic ferret ownership in 48 states, there are no known populations of feral ferrets in the United States. This refutes concerns that ferrets could become an invasive species in California. Unlike other animals that have formed feral populations (such as cats and rabbits), ferrets lack the survival skills necessary to establish and sustain wild populations. The absence of feral ferret colonies nationwide further supports the argument that California's continued ban is based on unfounded fears rather than actual environmental risks.

/State of California  
The Resources Agency  
Department of Fish and Game  
Habitat Conservation and Planning Branch

## 1996-97 NATIONWIDE FERRET SURVEY OF STATE WILDLIFE AGENCIES<sup>1</sup>

Originator and Compiler: Ronald M. Jurek, Wildlife Biologist, Species Conservation and Recovery Program;  
Database Management: Pamela Ryan, Scientific Aid, Bird and Mammal Conservation Program.

1999

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**SUMMARY.** In October 1996, the California Department of Fish and Game mailed a survey questionnaire to each state wildlife agency in the nation to obtain legal and natural history information regarding domestic ferrets (*Mustela putorius furo*). All state wildlife agencies, including California, were polled. The goal was to determine the concerns of each state wildlife agency and to clarify what authority and role each state wildlife agency had regarding ferrets. This was undertaken to obtain information for use by California Department of Fish and Game in assessing environmental concerns relating to proposed legalization of ferrets as pets in California. All states responded. A database was developed and survey results were tabulated to summarize the wide array of responses state agencies provided on agency authority and other legal background, ferret classification and terminology, status of ferrets owned or wild, and environmental concerns.

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<sup>1</sup> Jurek, R.M., and P. Ryan. 1999. 1996-97 Nationwide ferret survey of state wildlife agencies. Calif. Dep. of Fish and Game, Habitat Conservation and Planning Branch, Species Conservation and Recovery Program report. Sacramento, CA. 14 pp. plus appendices.

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### BACKGROUND

Restrictions on the importation and possession of domestic ferrets (*Mustela putorius furo*) have been in effect under California state law and regulations since 1933. Promotion of domestic ferrets as pet animals began nationally in the 1970s, and subsequently some states that formerly restricted possession of ferrets enacted laws to legalize them as pets. By the early 1990s, the California Fish and Game Commission (Commission) had addressed many ferret possession issues but did not eliminate restrictions on ferret possession. California is one of two states where possession of ferrets as pets is still not allowed.

Since 1994, ferret organizations have promoted legislative changes to allow importation and ownership of ferrets in California for pet purposes, but several proposed bills failed passage.

In 1995, the California Domestic Ferret Association publicly requested that the Commission remove the domestic ferret from the list of restricted "wild animals" under Title 14, Section 671. At their November 2, 1995 meeting, the Commission voted to submit a notice of proposed regulatory action to the Office of Administrative Law to consider removing the ferret from that list. That regulatory process was to be initiated after a draft environmental document had been completed for public review. The Department of Fish and Game (Department) was asked by the

Commission to prepare an environmental document. The Department responded at that time that the earliest staff could begin work on such a document would be in spring 1996.

The Department's Wildlife Management Division reassigned endangered species staff time to this undertaking in May 1996. To establish the scope of the document, the Department focussed on two main areas of information gathering. The first was a bibliographic search. The Department contracted with the University of California at Davis to conduct an extensive literature search of libraries, Internet sources, and other information sources. That bibliography was published as an administrative report in 1997 (Whisson and Moore, 1997).

The other part of the scoping process entailed canvassing each state for pertinent information on their laws and regulations and on the status of the ferret. The goal was to determine the concerns of each state wildlife agency and to clarify what authority and role each state wildlife agency had regarding ferrets. Such information would be useful to the Department for preparing the environmental document for the Commission. A questionnaire was developed for this survey.

In October 1996, the Wildlife Management Division of California Department of Fish and Game mailed the questionnaire to each state wildlife agency in the nation.

Meanwhile, the Office of the Attorney General had been conducting a legal analysis of the Commission's power to designate "wild animals" and limitations, if any, of adopted regulations. In November 1996, the State Deputy Attorney General informed the Commission that, in his opinion, the Commission did not have the authority to adopt regulations to remove restrictions on ferrets, so legalization of ferrets was a legislative matter. On November 8, 1996, the Commission accepted that decision and proposed to work with the California Legislature on legislation to provide guidance and clarification to the Commission. Therefore, with no pending Commission action, there was no longer a need for the environmental document. However, the nationwide survey information would be useful if future legislation or Commission actions include requirements for environmental documentation.

## **SURVEY QUESTIONNAIRE**

The four-page Domestic Ferret Questionnaire form (Appendix A) covered many of the subject areas pertinent to wildlife agencies, such as agency authority and other legal background, terminology, status of ferrets owned or wild, and environmental concerns.

### **Agency Authority**

The questionnaire asked where state legal authority resided for setting regulations on importation and possession of ferrets; whether there were state regulations prohibiting the release of ferrets from captivity; and whether the state wildlife agency had authority to enforce ferret laws and regulations.



It asked which entities in state government had authority for issuing permits to import and possess ferrets for various uses, such as for pet keeping and use in sport hunting. Also, it asked whether there were restrictions or permit requirements for persons to breed ferrets for various purposes. Respondents were asked to provide details on breeding permit fee structure and restrictions.

Respondents were asked whether they were aware of any local government ordinances prohibiting ownership of ferrets.

### Legal History

Regarding the history of ferret restrictions, states were asked when, if ever, the state wildlife agency received authority to regulate importation or possession of ferrets; and when importation and possession were legalized in the state, and by what entity.

### Classification and Terminology

The questionnaire requested information on how ferrets were classified under state laws and regulations, and what nomenclature and other terms were used to identify the species.

### Owned Ferrets

Each agency was asked to estimate the number of ferrets owned in their state, under various categories of use. They were asked what restrictions and permit requirements exist for captive breeding of ferrets and, if applicable, the number of permits issued.

### Stray and Feral Ferrets

The agencies were asked whether they had evidence of stray ferrets in urban areas and in the wild, what facilities handle lost or abandoned ferrets, and what actions agencies would take upon discovering individual ferrets on state wildlife lands. Regarding survival of ferrets in the wild, agencies were asked whether they had documentation that individuals survived more than a few days in the wild; whether they suspected or had documented evidence of ferrets breeding in the wild, currently or in the past; and what the likelihood was that ferrets had established a breeding population in the state. Also, the questionnaire asked what effort the wildlife agency had made to assess the status of ferrets in the wild, and how the effort was made. Each agency was asked what actions it would take upon discovering an established breeding population of ferrets in the state.

## Environmental Issues

Respondents were asked to describe their environmental concerns. The questionnaire requested whether an environmental impact report or written evaluation was prepared for legalizing ferret ownership. Also, for states that regulate ferret ownership, it asked how useful regulation is in meeting state concerns.

Also, the respondents were asked to provide copies of pertinent reports and materials, such as copies of regulations.

## **RESPONSES AND FOLLOW-UP**

By December 1996, 73% of the states had responded. That month, the Department mailed a follow-up questionnaire to the remaining states, and telephone call reminders were made to all states that still had not responded by January 1997 to the second mailing. By April 1997, all remaining states had responded.

Questionnaire responses were reviewed by staff for completeness and clarity. When incomplete questionnaires or unclear responses were found, the contact person listed on the questionnaire was reached by telephone and requested to provide the missing information or clarification. The individual who completed the original questionnaire was asked to provide the information, or to have other appropriate individuals do so.

Responses were entered into a database (Visual dBASE®) for tabulation and summary. Questionnaire results are summarized below. For details of responses by the states, see the tabulations in Appendix B.

## **RESULTS**

### History of State Legalization

According to these responses, ferrets have never been prohibited by state law in 36 states (72%). In one of these, Ohio, ferrets are not prohibited except for use in sport hunting (Appendix B-1).

Of 14 states with a history of having had prohibitions, eight reported that legalization has since occurred, all within the period 1985-1995. In 1985, a court decision in Alaska resulted in removal of that state's authority to prohibit ferret ownership. From 1987 through 1995, seven more states legalized ferret ownership. This was done by state legislation in six states and by state wildlife agency action in one (Utah).

|               | <u>YEAR LEGALIZED</u> | <u>HOW LEGALIZED</u>            |
|---------------|-----------------------|---------------------------------|
| Alaska        | 1985                  | Court decision                  |
| Pennsylvania  | 1987                  | State legislation               |
| Vermont       | 1989                  | State legislation               |
| Georgia       | 1991                  | State legislation               |
| New Hampshire | 1993                  | State legislation               |
| Utah          | 1993                  | Action by state wildlife agency |
| Michigan      | 1994                  | State legislation               |
| Massachusetts | 1995                  | State legislation               |

In six states, ferrets are prohibited, except under certain conditions (see Classification). Permits are required for possession as pets or for breeding in Kentucky, New Jersey, New York, and Rhode Island. In California and Hawaii, importation and possession for pet keeping or breeding are illegal, as no permits are issued (see Classification).

### Regulation Authority

In more than half (54%, or 27/50) of the states, neither the state wildlife agency, natural resources agency, or the wildlife commission had authority for setting ferret-related regulations (Appendix B-2). Those states responding that they had no regulations in this regard were Idaho, Iowa, and Ohio.

Here are responses to the question, "Which entity(ies) has authority for setting state regulations regarding the importation and possession of domestic ferrets in your state?" [five possible entities and 'None' were listed; more than one entry could be marked] <sup>1</sup>:

| <u>Entity/Agency</u>             | <u>Percent</u> | <u>Number (of 50)</u> |
|----------------------------------|----------------|-----------------------|
| Wildlife/Natural Resources *     | 30% *          | 15 *                  |
| Wildlife Commission *            | 18 *           | 9 *                   |
| Legislature                      | 40             | 20                    |
| Agriculture                      | 36             | 18                    |
| Health Department                | 22             | 11                    |
| None                             | 6              | 3                     |
| Other State Government Agency    | 4              | 2                     |
| Board of Animal Health/State Vet | 6              | 3                     |
| Local Agencies                   | 8              | 4                     |

\* The number of states with authority under a state wildlife agency, or natural resource agency, or wildlife commission, or a combination of them, totaled 23.

<sup>1</sup> In many summary tables in this report, totals exceed 50 states or 100%, because states could mark more than one pertinent answer for many of the questions.

### State Wildlife Agency Authority to Regulate Ferrets

To the question, "When did your state wildlife agency receive authority to regulate importation or possession of domestic ferrets?," 56% (28/50) of the state wildlife agencies responded "Never". Three states did not have this information (Connecticut, North Carolina, and Vermont) (Appendix B-1).

Regulation authority had been granted to state wildlife agencies in 19 states.

|               |                   |            |      |
|---------------|-------------------|------------|------|
| Massachusetts | 1920              | Nevada     | 1947 |
| Illinois      | ca 1925           | Virginia   | 1950 |
| Michigan      | 1927              | Alaska     | 1958 |
| New Mexico    | 1927              | New Jersey | 1969 |
| Rhode Island  | 1929 (& 1981)     | New York   | 1972 |
| New Hampshire | 1930s, until 1993 | Georgia    | 1977 |
| California    | 1933              | Maryland   | 1985 |
| Pennsylvania  | 1937              | Ohio       | 1994 |
| Kentucky      | 1942              | Indiana    | 1995 |
| Florida       | 1947              |            |      |

### State Wildlife Agency Authority to Enforce Ferret Laws and Regulations

About one third of the state wildlife agencies had authority to enforce laws and regulations on the importation and possession of ferrets. Also, about one third of the state wildlife agencies reported that they did not have authority to enforce laws and regulations on use of ferrets for hunting. About a quarter of the states had such authority regarding ferret breeding (Appendix B-3).

|             | YES     |             | NO      |             | No Report |             |
|-------------|---------|-------------|---------|-------------|-----------|-------------|
|             | Percent | No. (of 50) | Percent | No. (of 50) | Percent   | No. (of 50) |
| IMPORTATION | 34%     | 17          | 62%     | 31          | 4%        | 2           |
| POSSESSION  | 30      | 15          | 66      | 33          | 4         | 2           |
| HUNTING     | 62      | 31          | 34      | 17          | 4         | 2           |
| BREEDING    | 26      | 13          | 70      | 35          | 4         | 2           |

### Authority to Issue Permits

The state wildlife agency, natural resources agency, or state wildlife commission (or these in combination) had authority to issue permits to possess ferrets for certain uses, as follows (Appendix B-4):

|                   | <u>Percent with authority</u> | <u>Number (of 50)</u> |
|-------------------|-------------------------------|-----------------------|
| IMPORTATION       | 28%                           | 14                    |
| HUNTING           | 26                            | 13                    |
| BREEDING          | 24                            | 12                    |
| PETS              | 20                            | 10                    |
| LAB ANIMAL        | 16                            | 8                     |
| FARM PEST CONTROL | 12                            | 6                     |

### Agency Authority to Issue Permits for Pet Ferrets

Of the 24 states that listed an agency or agencies with authority to issue permits for keeping ferrets as pets, eight states listed the state wildlife/natural resource/commission; six listed "local governments", five listed the "state agriculture agency", and four listed combinations of these or other entities (Appendix B-4).

### Agency Authority to Issue Permits for Use of Ferrets as Lab Animals

Of the 21 states that listed an agency or agencies with authority to issue permits for keeping ferrets as laboratory animals, eight marked the "state agriculture agency", seven listed the state wildlife/natural resource/commission; one listed the state wildlife/natural resources agency in combination with a "federal agency"; two others listed the "federal agency"; and one each listed "Department of Environmental Conservation", "local government", and "state health agency" (Appendix B-4).

### Agency Authority to Issue Permits for Use of Ferrets in Farm Pest Control

Of the 15 states that listed an agency or agencies with authority to issue permits for use of ferrets in farm pest control, six marked "state agriculture agency", three listed "state wildlife commission", three listed "state wildlife/natural resources agency", one listed "local government", and one listed "state agriculture agency" but also checked "activity is prohibited statewide". Ten other states indicated that the "activity is prohibited statewide" (Appendix B-4).

### Use of Ferrets for Sport Hunting

Twenty-two states (44%) reported that use of ferrets for sport hunting is prohibited statewide. No information on this topic was received from 16 states, and one state reported "Not applicable" (Appendix B-4).

Of 14 states reporting that some entity had authority to issue permits for use of ferrets for sport hunting, six indicated that authority resided with the state wildlife/natural resources agency, but two of these were states that reported the use to be prohibited statewide. Five states reported that the authority rested with the state wildlife commission, but one of these also reported that the use was prohibited statewide. Two states reported that the authority resided with both the state wildlife/natural resources agency and the state wildlife commission, and one state listed the authority residing with the state agricultural agency.

#### Awareness of Local Government Ordinances Restricting Ownership

Forty-two state wildlife agencies (84%) indicated that they were not aware of local government restrictions on ownership of ferrets, and three others did not respond (Appendix B-3).

Only five states indicated that they were aware of local government agencies adopting ordinances prohibiting ownership of ferrets. Georgia listed Douglas County; Missouri listed Columbia; Ohio mentioned that several cities have such restrictions; and Texas listed San Antonio and perhaps Dallas, Ft. Worth, and Beaumont. Indiana gave no examples.

#### Classification

State wildlife agencies use a variety of terms to classify ferrets under their regulations. Some states use more than one of the classifications described here. Five states reported that they used no such specific classifications. The most common classifications were "domestic animal" and "exotic", which were used alone or in combination with other classifications. Twenty-five (50%) of the states classified the ferret as a "domestic animal"; five of those states classified them as "exotic", as well. Sixteen states (32%) classified them as "exotic"; five of those states also classified them as both "exotic" and "domestic animal", and two classified them as "exotic" together with other classifications, including "prohibited" and "nongame" (Appendix B-5).

Only one or two states each classify ferrets as "nongame", "furbearer", "wild animal", "restricted", "non-protected", or other special designation.

The 50 states reported the following classifications used in regulations:

|                 |     |                                          |     |
|-----------------|-----|------------------------------------------|-----|
| Nongame         | 4%  | Prohibited, except under permit          | 10% |
| Furbearer       | 2%  | Restricted                               | 4%  |
| Wild animal     | 4%  | Not protected                            | 4%  |
| Domestic animal | 50% | Not applicable (no specific designation) | 10% |
| Exotic          | 32% | Other (Tennessee: "Class III Wildlife)   | 2%  |

Rhode Island reported that importation and possession of ferrets are prohibited, but did not classify them under that category, classifying them rather as a furbearer. Under Tennessee's Class III provision, no permit is required unless so required by the department of agriculture.



## Nomenclature

Various names are used in state regulations to identify ferrets. Thirty-one (62%) of the states use "ferret", or "domestic ferret", or "European ferret", or a combination of these. Less common terms used by some states are fitch, fitch ferret or European fitch ferret, European polecat, polecat, and *Mustela putorius furo*. No states reported using the terms English ferret or polecat/ferret hybrid (Appendix B-5).

The 50 states reported the following nomenclature used in regulations:

|                       |     |                                    |     |
|-----------------------|-----|------------------------------------|-----|
| European polecat      | 2%  | Other related terms:               |     |
| Polecat               | 2%  | European ferret                    | 14% |
| English ferret        | 0   | Fitch ferret/European fitch ferret | 4%  |
| Domestic ferret       | 20% | <i>Mustela putorius furo</i>       | 2%  |
| Ferret                | 42% | None                               | 12% |
| Fitch                 | 6%  | Not applicable                     | 8%  |
| Polecat/ferret hybrid | 0   | No response                        | 12% |

## Estimated Number of Legally Possessed Ferrets

Forty states (80%) indicated that the number of legally possessed ferrets was "Unknown", or they gave no response, or listed it as not applicable. Hawaii listed the number as zero, and nine states estimated or listed totals ranging from 150 to over 20,000. Fourteen states indicated that there were no legal hunting ferrets (Appendix B-6).

The nine states that estimated populations of legal ferrets gave the following numbers, according to categories of use (a question mark listed below means that "?" was part of the answer used by respondent on the form. An asterisk (\*) indicates that more detailed information is given in Appendix B-6):

| <u>State</u>  | <u>Total</u>              | <u>Pets</u>      | <u>Breeding Stock</u> | <u>Lab Animals</u> | <u>Hunting Ferrets</u> |
|---------------|---------------------------|------------------|-----------------------|--------------------|------------------------|
| Alaska        | 300                       | 300              | ?                     | ?                  | 0                      |
| Arizona       | 10,000*                   | 9,500?           | 500?                  | ?                  | 0                      |
| California    | <500                      | 0                | 0                     | <500               | 0                      |
| Illinois      |                           | > 671*           | unknown*              | prob. <100*        | prob. 0                |
| Kentucky      | 150                       | 35*              | 25*                   | 0                  | 0                      |
| Massachusetts | ~2,000*                   | ~2,000           | 0*                    | 100-200            | 0                      |
| New Jersey    |                           | 20,000*          | unknown               | 2,000              | 0                      |
| New York      |                           | -----6,000*----- |                       |                    |                        |
| Rhode Island  | (pets: several thousands) |                  |                       |                    |                        |

### Stray Ferrets in Urban Areas

Most states reported having knowledge of stray ferrets in urban areas. Fifteen states (30%) reported "None", 28 states (56%) reported them to be "Rare" or "Sporadic", and New Mexico and Georgia (4%) reported them to be "Common" and "Frequent", respectively. Five states (10%) reported "Unknown" or gave no response (Appendix B-7).

No responses or the response "Unknown" were received from Kansas, Louisiana, Maine, Montana, and Oregon regarding strays in urban areas.

### Ferrets Surviving in the Wild

Five states (10%) (Alaska, Connecticut, Massachusetts, Washington and Wyoming) reported free-living individual ferrets documented as having survived more than a few days in the wild. Three states (Kansas, Montana and Rhode Island) (6%) reported "Unknown". The other states reported having no such documentation (Appendix B-7).

### Ferrets Breeding in The Wild

No state reported suspected breeding or documented breeding by ferrets in the wild now (1996/97). Three states (6%) (Alaska, New Mexico, and Washington) reported suspected breeding by ferrets in the wild in the past. No state reported documented breeding by ferrets in the past. Connecticut gave no response to the question about whether breeding was suspected in the past, and Kansas reported "Unknown" (Appendix B-7).

### Knowledge of Breeding Populations

Asked about the potential for having established breeding populations of ferrets in the state, no state wildlife agency marked these possibilities: "definitely exists," "probably exists," "definitely existed but definitely no longer exists", or "definitely existed but current status is unknown." States could mark more than one category (Appendix B-7).

Ten states (20%) replied that an established breeding population "definitely does not exist", 27 (54%) replied that one "probably does not exist", and five (10%) replied that one "would not likely exist".

Seven states (14%) replied that such a population "cannot be determined without special survey". Three (6%) states (Indiana, Kansas and Texas) replied "Unknown".

No state wildlife agency marked the option that an established breeding population "would not be a serious concern".

### Effort to Assess the Status of Ferrets in the Wild

Asked about the amount of effort the state wildlife agencies have made to assess the status of ferrets in the wild, 43 states (86%) reported "None". Respondents in 34 of the states reported that it was "not considered to be important", and six of the states reported that such assessment would be "desirable but not feasible" (Appendix B-8).

Seven states (14%) reported some level of effort to assess the status of ferrets in the wild. One state (Arizona) reported making an "intense effort." This was done as part of reintroduction efforts for the endangered black-footed ferret. One state (Wyoming) reported making a "moderate effort", which also related to black-footed ferret reintroduction efforts. Five states (10%) (Colorado, Michigan, Nevada, New Mexico, and Rhode Island) reported making "little effort".

### Methods of Assessing Status of Ferrets in the Wild

Seventeen states indicated what method is used to assess status of ferrets in the wild. Of the seven states that reported having made some level of effort, six checked "opportunistically document", one marked "thoroughly check out all reports", one checked "special sampling", and two checked "concerted surveys." Ten states that did not report making some level of effort to assess status of ferrets in the wild indicated that they "opportunistically document". No state agency responded that they "routinely check during area studies" (Appendix B-8).

### Control of Individual Ferrets Discovered on State Wildlife Lands

Each state marked one or more of the following responses about how individual ferrets would be controlled on state lands (Appendix B-8):

| <u>Action</u>                                | <u>Percent</u> | <u>Number (of 50)</u> |
|----------------------------------------------|----------------|-----------------------|
| Local area management decision               | 38%            | 19                    |
| Live trap and take to shelter (presumed pet) | 32             | 16                    |
| Take by any means                            | 32             | 16                    |
| Live trap and euthanasia                     | 12             | 6                     |
| No action would be taken                     | 8              | 4                     |
| Lethal traps                                 | 2              | 1                     |

### Agency Action Upon Discovery of Established Breeding Population

Each state marked one or more of the following responses about how breeding populations of ferrets would be handled (Appendix B-8):

| <u>Action</u>                               | <u>Percent</u> | <u>Number (of 50)</u> |
|---------------------------------------------|----------------|-----------------------|
| Attempt eradication                         | 58%            | 29                    |
| Local area management decision              | 18             | 9                     |
| No action would be taken                    | 4              | 2                     |
| Other:                                      |                |                       |
| Capture and turn over to ferret groups      | 2              | 1                     |
| Unknown/undecided/determine extent then act | 24             | 12                    |

### Prohibition on Release of Ferrets

Asked whether the state has regulations that clearly prohibit the release of ferrets from captivity, 23 states (46%) responded "Yes", and 27 (54%) responded "No" (Appendix B-3).

### Facilities for Lost or Abandoned Ferrets

Wildlife agencies reported the following facilities that handle lost or abandoned ferrets (Appendix B-9):

| <u>Facility</u>                     | <u>Percent</u> | <u>Number of states</u> | <u>Permit Needed?</u> |           |            |           |
|-------------------------------------|----------------|-------------------------|-----------------------|-----------|------------|-----------|
|                                     |                |                         | <u>Yes</u>            | <u>No</u> | <u>Unk</u> | <u>NR</u> |
| Humane Society shelters             | 78%            | 39                      | 7                     | 29        | 2          | 1         |
| Private ferret shelters             | 28             | 14                      | 4                     | 10        |            |           |
| Wildlife rehabilitation centers     | 20             | 10                      | 4                     | 6         |            |           |
| Animal control centers              | 10             | 5                       | 2                     | 2         | 1          |           |
| State wildlife agency facilities    | 4              | 2                       | -                     | -         | -          |           |
| State agriculture agency facilities | 2              | 1                       | -                     | -         | -          |           |
| State health agency facilities      | 2              | 1                       | -                     | -         | -          |           |
| Cooperators ship out of state       | 2              | 1                       | 1                     | -         | -          |           |
| No facilities                       | 2              | 1                       | -                     | -         | -          |           |
| Unknown                             | 2              | 1                       | -                     | -         | -          |           |

Unk - unknown; NR - no report; hyphen - not applicable

## Captive Breeding Restrictions

Agencies reported the following restrictions on captive breeding of ferrets (Appendix B-10):

### Breeding of domestic ferrets for pet trade:

|                       |         |                           |        |
|-----------------------|---------|---------------------------|--------|
| Not restricted = 60 % | (30/50) | Under state permit = 16 % | (8/50) |
| Not allowed = 8 %     | (4/50)  | Under local permit = 2 %  | (1/50) |

### Breeding ferrets to supply laboratories:

|                       |         |                           |        |
|-----------------------|---------|---------------------------|--------|
| Not restricted = 56 % | (28/50) | Under state permit = 16 % | (8/50) |
| Not allowed = 8 %     | (4/50)  | Under local permit = 2 %  | (1/50) |

### Breeding for fur market:

|                       |         |                           |        |
|-----------------------|---------|---------------------------|--------|
| Not restricted = 60 % | (30/50) | Under state permit = 14 % | (7/50) |
| Not allowed = 6 %     | (3/50)  | Under local permit = 2 %  | (1/50) |

### Breeding for hunting:

|                       |         |                          |        |
|-----------------------|---------|--------------------------|--------|
| Not restricted = 44 % | (22/50) | Under state permit = 0   |        |
| Not allowed = 34 %    | (17/50) | Under local permit = 2 % | (1/50) |

### Importation or possession of European polecats for breeding purposes:

|                       |         |                           |         |
|-----------------------|---------|---------------------------|---------|
| Not restricted = 42 % | (21/50) | Under state permit = 20 % | (10/50) |
| Not allowed = 10 %    | (5/50)  | Under local permit = 4 %  | (2/50)  |

### Importation or possession of hybrids (polecat/ferret) for breeding purposes:

|                       |         |                           |         |
|-----------------------|---------|---------------------------|---------|
| Not restricted = 42 % | (21/50) | Under state permit = 20 % | (10/50) |
| Not allowed = 8 %     | (4/50)  | Under local permit = 4 %  | (2/50)  |

## State Regulation of Breeding of Ferrets

Only 6 states (12%) provided permit information with regard to their regulating captive breeding of ferrets (Appendix B-11). Two other states reported they have issued no breeding permits, eight states reported that this subject is not applicable, and 35 states gave no response.

## Environmental Concerns

Respondents in half of the states described environmental concerns or lack thereof, and the other 25 states provided no comments. Their responses are list in Appendix B-8.

No state wildlife agency indicated that an established breeding population "would not be a serious concern" (See page 10, Knowledge of Breeding Populations).

Asked whether an environmental impact report, or equivalent, or a written evaluation was prepared for legalizing ferret ownership in the state, no state reported "Yes", six (12%) reported "No" (Georgia, Massachusetts, Pennsylvania, Utah, and Vermont), or "No" and "Not needed" (New Hampshire). One state (Michigan) responded "Unknown". The other states (43, or 86%) reported "Not applicable" (Appendix B-1).

States were asked to characterize how useful agency regulation of ferrets (e.g., by permit) is in meeting environmental and other state concerns. Respondents from eight states provided responses (Appendix B-11).

### **LITERATURE CITED**

Whisson, D., and T. Moore. 1997. An annotated bibliography on the ferret (*Mustela putorius furo*). Calif. Dep. Fish and Game, Wildl. Manage. Div., Bird and Mammal Conservation Program Rep. 97-3, Sacramento, CA. 37 pp.



## **Appendix A. Ferret Survey Questionnaire Cover Letter and Form**

### **Cover Letter**

October 21, 1996

Dear (state wildlife agency)

The State of California restricts the importation and possession of domestic ferrets and prohibits them as pets. The California Fish and Game Commission has been petitioned to remove the ferret from these prohibitions.

Our Department is gathering background information for assessing the environmental concerns related to legalization of the domestic ferret in the State. We request your assistance by providing us with information about ferret ownership in your state.

Attached is a four-page questionnaire that addresses many of the issues we feel are important in our assessment. We would appreciate knowing your state's laws and regulations, your agency's management approaches related to ownership and use of ferrets, and your environmental considerations.

Also, we would appreciate your providing us with copies of related reports or other material that you feel might help us in our evaluation.

All state wildlife agencies in the Nation are receiving this. We will prepare a summary report of responses and will provide a copy to every state wildlife agency.

Please return the completed questionnaire by November 15, 1996. The questionnaire and any supplemental material should be mailed to California Department of Fish and Game, Mr. Terry M. Mansfield, Chief Wildlife Management Division, 1416 Ninth Street, Sacramento, California 95814. If you have questions, please contact Mr. Ron Jurek, Wildlife Biologist, at the same address or by telephone at (916) 654-4267.

Thank you in advance for your assistance.

Sincerely,

Terry M. Mansfield, Chief  
Wildlife Management Division

# DOMESTIC FERRET QUESTIONNAIRE — STATE WILDLIFE AGENCIES

OCTOBER 1996

STATE: \_\_\_\_\_

Agency contact(s): \_\_\_\_\_

Agency and unit responding: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Date: \_\_\_\_\_

**LEGAL AUTHORITY:** Which entity(ies) has authority for setting state regulations regarding the importation and possession of domestic ferrets in your state?

- |                                                                |                                                 |
|----------------------------------------------------------------|-------------------------------------------------|
| <input type="checkbox"/> Legislature                           | <input type="checkbox"/> Agriculture department |
| <input type="checkbox"/> Wildlife commission                   | <input type="checkbox"/> Health department      |
| <input type="checkbox"/> Wildlife/natural resources department | <input type="checkbox"/> None                   |
|                                                                | <input type="checkbox"/> Other: _____           |

Comments: \_\_\_\_\_

**PERMITS:** Which entity has authority for issuing permits to possess domestic ferrets for the following activities?

|                                         | Import-<br>ation | Sport<br>Hunting | Farm Pest<br>Control | Lab<br>animal | Pet | Breeding |
|-----------------------------------------|------------------|------------------|----------------------|---------------|-----|----------|
| State wildlife commission               |                  |                  |                      |               |     |          |
| State wildlife/natural resources agency |                  |                  |                      |               |     |          |
| State agriculture agency                |                  |                  |                      |               |     |          |
| State health agency                     |                  |                  |                      |               |     |          |
| Local governments                       |                  |                  |                      |               |     |          |
| Other entity: _____                     |                  |                  |                      |               |     |          |
| Activity is prohibited statewide        |                  |                  |                      |               |     |          |

Comments: \_\_\_\_\_

Are you aware of any local government agencies that have adopted ordinances prohibiting ownership of ferrets? \_\_\_\_\_

Does your state wildlife agency have authority to enforce ferret laws and regulations for:

|             |               |          |               |
|-------------|---------------|----------|---------------|
| Importation | <b>Yes No</b> | Hunting  | <b>Yes No</b> |
| Possession  | <b>Yes No</b> | Breeding | <b>Yes No</b> |

Do you have state regulations that clearly prohibit the release of ferrets from captivity? **Yes\* No**  
 (\* If yes, please attach a copy of the regulation)

## HISTORY

When did your State wildlife agency receive authority to regulate importation or possession of domestic ferrets?  
Year \_\_\_\_\_, or ☐ Never.

Domestic ferret importation and possession:

- ☐ have never been prohibited by the state
- ☐ are prohibited, except under special conditions [please describe in comments below]  
[By which agency? \_\_\_\_\_]
- ☐ were legalized in the year \_\_\_\_\_, by means of ☐ state legislation  
☐ wildlife commission action,  
☐ wildlife agency action,  
☐ other: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## CLASSIFICATION:

How are ferrets classified under your state regulations? [mark which ones apply]:

- |                                           |                                                          |
|-------------------------------------------|----------------------------------------------------------|
| <input type="checkbox"/> Nongame          | <input type="checkbox"/> Exotic*                         |
| <input type="checkbox"/> Furbearer        | <input type="checkbox"/> Prohibited, except under permit |
| <input type="checkbox"/> Wild animal*     | <input type="checkbox"/> Restricted                      |
| <input type="checkbox"/> Domestic animal* | other _____                                              |

\*If marked, please quote definition, if any: \_\_\_\_\_  
\_\_\_\_\_

## NOMENCLATURE:

Please indicate which of these terms are used in your state regulations?

- |                                           |                                                  |
|-------------------------------------------|--------------------------------------------------|
| <input type="checkbox"/> European polecat | <input type="checkbox"/> fitch                   |
| <input type="checkbox"/> polecat          | <input type="checkbox"/> polecat / ferret hybrid |
| <input type="checkbox"/> English ferret   | Other related terms:<br>_____<br>_____           |
| <input type="checkbox"/> domestic ferret  |                                                  |
| <input type="checkbox"/> ferret           |                                                  |

Estimated Number of Legally Possessed Ferrets: TOTAL: \_\_\_\_\_

Pets \_\_\_\_\_  
Breeding stock \_\_\_\_\_

Lab animals \_\_\_\_\_  
Hunting ferrets \_\_\_\_\_

## WILD STATUS:

Do you have evidence of the following?

Cases of stray individuals in urban areas    None    Rare    Sporadic    Common    Frequent

Free-living individuals documented as surviving more than a few days in the wild    Yes\*    No

Breeding suspected in the wild now    Yes    No, or in the past    Yes    No

Breeding individuals documented in the wild now    Yes\*    No, or in the past    Yes\*    No

(\* If possible, please enclose documentation.)

An established breeding population of domestic ferrets in your state:

- |                                                                              |                                                                             |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <input type="checkbox"/> definitely does not exist                           | <input type="checkbox"/> definitely existed but definitely no longer exists |
| <input type="checkbox"/> probably does not exist                             | <input type="checkbox"/> definitely existed but current status is unknown   |
| <input type="checkbox"/> would not likely exist                              | <input type="checkbox"/> definitely exists                                  |
| <input type="checkbox"/> has been reported, but not confirmed<br>as existing | <input type="checkbox"/> cannot be determined without special survey        |
| <input type="checkbox"/> probably exists                                     | <input type="checkbox"/> would not be a serious concern                     |

What effort has your state wildlife agency made to assess status of ferrets in the wild:

- |                                                               |                                                           |
|---------------------------------------------------------------|-----------------------------------------------------------|
| <input type="checkbox"/> None, not considered to be important | <input type="checkbox"/> None, desirable but not feasible |
| <input type="checkbox"/> Little effort                        | <input type="checkbox"/> Moderate effort                  |
|                                                               | <input type="checkbox"/> Intense effort                   |

How is this effort made?

- |                                                              |                                                           |
|--------------------------------------------------------------|-----------------------------------------------------------|
| <input type="checkbox"/> Opportunistically document          | <input type="checkbox"/> Thoroughly check out all reports |
| <input type="checkbox"/> Routinely check during area studies | <input type="checkbox"/> Special sampling                 |
|                                                              | <input type="checkbox"/> Concerted surveys                |

If an individual domestic ferret were discovered on your State wildlife lands, what control action would be taken by your staff?

- |                                                                               |                                                         |
|-------------------------------------------------------------------------------|---------------------------------------------------------|
| <input type="checkbox"/> Live trap and take to shelter<br>(presumed lost pet) | <input type="checkbox"/> Take by any means              |
| <input type="checkbox"/> Live trap and euthanasia                             | <input type="checkbox"/> No action would be taken       |
|                                                                               | <input type="checkbox"/> Local area management decision |

What action would state agencies take upon discovery of an established breeding population of ferrets?

- |                                              |                                                   |                                                         |
|----------------------------------------------|---------------------------------------------------|---------------------------------------------------------|
| <input type="checkbox"/> Attempt eradication | <input type="checkbox"/> No action would be taken | <input type="checkbox"/> Local area management decision |
| <input type="checkbox"/> Other: _____        |                                                   |                                                         |

What facilities handle lost or abandoned ferrets?:

- |                                                              | Under permit only        | No permit needed         |
|--------------------------------------------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> private ferret shelters             | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> humane society shelters             | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> wildlife rehabilitation centers     | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> state wildlife agency facilities    |                          |                          |
| <input type="checkbox"/> state agriculture agency facilities |                          |                          |
| <input type="checkbox"/> state health agency facilities      |                          |                          |
| <input type="checkbox"/> other _____                         | <input type="checkbox"/> | <input type="checkbox"/> |

**CAPTIVE BREEDING:**

| Activity                                                                    | Not restricted | Not allowed | Under state permit | Under local permit |
|-----------------------------------------------------------------------------|----------------|-------------|--------------------|--------------------|
| Breeding of domestic ferrets for pet trade                                  |                |             |                    |                    |
| Breeding ferrets to supply laboratories                                     |                |             |                    |                    |
| Breeding for fur market                                                     |                |             |                    |                    |
| Breeding for hunting                                                        |                |             |                    |                    |
| Importation or possession of European polecats for breeding purposes        |                |             |                    |                    |
| Importation or possession of hybrids (polecat/ferret) for breeding purposes |                |             |                    |                    |

Comments: \_\_\_\_\_

If your state wildlife agency regulates breeding of ferrets, please answer the following (or send pertinent information):

Number of permits: \_\_\_\_\_ Year \_\_\_\_\_

Fee structure: \_\_\_\_\_

\_\_\_\_\_

Restrictions, limits: \_\_\_\_\_

\_\_\_\_\_

**ENVIRONMENTAL CONCERNS** (please describe): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

If your agency actively regulates ownership of ferrets (e.g., by permit), how useful is this in meeting environmental and other concerns of your State? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Was an environmental impact report, or equivalent, or a written evaluation prepared for legalizing ferret ownership in your state? **Yes\***      **No**      **Not needed**      **Not applicable**

(\* Please attach a copy)

**Return to Mr. Terry Mansfield, Chief, Wildlife Management Div., California  
Department of Fish and Game, 1416 Ninth Street, Sacramento, CA 95814**

# DOMESTIC FERRET IMPORTATION & POSSESSION

| IMPORTATION & POSSESSION:                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 | LEGALIZED BY MEANS OF:            |                             | ENVRNT IMPACT DOCUMENT: |                       |                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------|-----------------------------|-------------------------|-----------------------|-------------------------|
| 1 = have never been prohibited by the state                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | SL = state legislature            |                             | Y / N                   |                       |                         |
| 2 = are prohibited, except under special conditions (see COMMENTS)                                                                                                                                                                                                                                                                                                                                                                                                             |                 | WCA = wildlife commission action  |                             | NN = not needed         |                       |                         |
| 3 = were legalized                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 | WAA = wildlife agency action      |                             | N/A = not applicable    |                       |                         |
| 4 = are not prohibited, except in certain activities (see COMMENTS)                                                                                                                                                                                                                                                                                                                                                                                                            |                 | CC = decision based on court case |                             |                         |                       |                         |
| NR = no response given (see COMMENTS)                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                                   |                             |                         |                       |                         |
| STATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | AGENCY RECEIVED | IMPORTATION & POSSESSION          | PROHIBITED BY WHICH AGENCY: | YEAR LEGALIZED          | LEGALIZED BY MEANS OF | ENVRNT IMPACT DOCUMENT? |
| ALABAMA                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | NEVER           | 1                                 | NR                          | NR                      | NR                    | N/A                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |                                   |                             |                         |                       |                         |
| ALASKA                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1958            | 3                                 | NR                          | 1985                    | WAA, CC               | N/A                     |
| RESPONDER'S COMMENTS: COURT CASE: HELFRICH V STATE OF ALASKA; THE BOARD OF GAME ADDED FERRETS TO THE LIST OF ANIMALS ALLOWED IN THE STATE WITHOUT A PERMIT AFTER A COURT CASE IN WHICH THE DISTRICT COURT JUDGE HELD THAT FERRETS WERE DOMESTIC ANIMALS AND THEREFORE, WERE NOT UNDER STATE JURISDICTION. PRIOR TO THAT FERRETS WERE NOT ALLOWED, BUT WERE BROUGHT INTO THE STATE ANYWAY.                                                                                      |                 |                                   |                             |                         |                       |                         |
| ARIZONA                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | NEVER           | 1                                 | NR                          | NR                      | NR                    | N/A                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |                                   |                             |                         |                       |                         |
| ARKANSAS                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | NEVER           | 1                                 | NR                          | NR                      | NR                    | N/A                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |                                   |                             |                         |                       |                         |
| CALIFORNIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1933            | 2                                 | FISH & GAME COMMISSION      | NR                      | NR                    | N/A                     |
| RESPONDER'S COMMENTS: UNTIL 1987, STERILIZED MALE FERRETS COULD BE IMPORTED AND POSSESSED AS PETS, UNDER DFG PERMIT.                                                                                                                                                                                                                                                                                                                                                           |                 |                                   |                             |                         |                       |                         |
| COLORADO                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | NEVER           | 1                                 | NR                          | NR                      | NR                    | N/A                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |                                   |                             |                         |                       |                         |
| CONNECTICUT                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | NR              | 1                                 | NR                          | NR                      | NR                    | N/A                     |
| RESPONDER'S COMMENTS: DEP (DEPARTMENT OF ENVIRONMENTAL PROTECTION) IN THE PAST HAD SPECIFIC AUTHORITY TO LICENSE FERRETS. THIS WAS INSTITUTED TO PREVENT PEOPLE FROM USING FERRETS FOR HUNTING. UPON RECOMMENDATION FROM THE DEP, THE LEGISLATURE REPEALED THIS LAW IN 1985. HUNTING WITH FERRETS IS STILL ILLEGAL. HOWEVER, CONNECTICUT'S SPORTSMEN DO NOT RECOGNIZE FERRETS AS A VIABLE MEANS TO HUNT. THEREFORE, THERE WAS NO NEED TO KEEP LICENSING THESE ANIMALS THAT ARE |                 |                                   |                             |                         |                       |                         |



# DOMESTIC FERRET IMPORTATION & POSSESSION

## IMPORTATION & POSSESSION:

- 1 = have never been prohibited by the state
- 2 = are prohibited, except under special conditions (see COMMENTS)
- 3 = were legalized
- 4 = are not prohibited, except in certain activities (see COMMENTS)
- NR = no response given (see COMMENTS)

## LEGALIZED BY MEANS OF:

- SL = state legislature
- WCA = wildlife commission action
- WAA = wildlife agency action
- CC = decision based on court case

## ENVRNT IMPACT DOCUMENT:

- Y / N
- NN = not needed
- N/A = not applicable

| STATE                                                                                                                                                                                                                                                                                   | AGENCY RECEIVED AUTHORITY ? | IMPORTATION & POSSESSION | PROHIBITED BY WHICH AGENCY: | YEAR LEGALIZED | LEGALIZED BY MEANS OF | ENVRNT IMPACT DOCUMENT ? |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------|-----------------------------|----------------|-----------------------|--------------------------|
| <p>PRIMARYLY PETS. *DEP STILL HAS AUTHORITY TO REGULATE IMPORTATION &amp; POSSESSION OF DOMESTIC FERRETS IF A PROBLEM SHOULD ARISE. THIS AUTHORITY IS NOT SPECIFIC TO FERRETS. RIGHT NOW, DEP CHOOSES NOT TO USE THIS AUTHORITY FOR DOMESTIC FERRETS.* (PERS. COMMUN. W/RESPONDENT)</p> |                             |                          |                             |                |                       |                          |
| DELAWARE                                                                                                                                                                                                                                                                                | NEVER                       | 1                        | NR                          | NR             | NR                    | N/A                      |
| <p>RESPONDER'S COMMENTS: THE STATE VETERINARIAN REGULATES EXOTIC ANIMALS. SMALL MAMMALS, SUCH AS FERRETS, GERBILLS, HAMPSTERS, ARE GIVEN A BLANKET EXCEPTION FROM THE NORMAL RULES THAT APPLY TO EXOTICS. IF A PROBLEM SHOULD ARISE, THE DEPT OF AG WOULD HAVE AUTHORITY TO ACT.</p>    |                             |                          |                             |                |                       |                          |
| FLORIDA                                                                                                                                                                                                                                                                                 | 1947                        | 1                        | NR                          | NR             | NR                    | N/A                      |
| <p>RESPONDER'S COMMENTS: NR</p>                                                                                                                                                                                                                                                         |                             |                          |                             |                |                       |                          |
| GEORGIA                                                                                                                                                                                                                                                                                 | 1977                        | 3                        | NR                          | 1991           | SL                    | N                        |
| <p>RESPONDER'S COMMENTS: NR</p>                                                                                                                                                                                                                                                         |                             |                          |                             |                |                       |                          |
| HAWAII                                                                                                                                                                                                                                                                                  | NEVER                       | 2                        | DEPT OF AGRICULTURE         | NR             | NR                    | N/A                      |
| <p>RESPONDER'S COMMENTS: SPECIAL CONDITIONS ARE BY PERMIT FOR RESEARCH BY STATE AND UNIVERSITY. APPROVED MEDICAL AND SCIENTIFIC PURPOSES, OR FOR ZOOS.</p>                                                                                                                              |                             |                          |                             |                |                       |                          |
| IDAHO                                                                                                                                                                                                                                                                                   | NEVER                       | 1                        | NR                          | NR             | NR                    | N/A                      |
| <p>RESPONDER'S COMMENTS: NO REGS</p>                                                                                                                                                                                                                                                    |                             |                          |                             |                |                       |                          |
| ILLINOIS                                                                                                                                                                                                                                                                                | ca. 1925                    | 1                        | NR                          | NR             | NR                    | N/A                      |
| <p>RESPONDER'S COMMENTS: PERMIT TO IMPORT/POSSESS ESTABLISHED ca. 1925; PERSONS WANTING TO HOLD A FERRET FOR A PET GET A "FREE" CLASS A PERMIT AND THOSE WHO RAISE AND SELL FERRETS NEED A CLASS B PERMIT. FERRET TRADE IS CONFINED TO RAISING AND SALE OF FERRETS FOR PETS.</p>        |                             |                          |                             |                |                       |                          |

## Appendix B-1

# DOMESTIC FERRET IMPORTATION & POSSESSION

## IMPORTATION & POSSESSION:

- 1 = have never been prohibited by the state
- 2 = are prohibited, except under special conditions (see COMMENTS)
- 3 = were legalized
- 4 = are not prohibited, except in certain activities (see COMMENTS)
- NR = no response given (see COMMENTS)

## LEGALIZED BY MEANS OF:

- SL = state legislature
- WCA = wildlife commission action
- WAA = wildlife agency action
- CC = decision based on court case

## ENVRNT IMPACT DOCUMENT:

- Y / N
- NN = not needed
- N/A = not applicable

| STATE   | AGENCY RECEIVED AUTHORITY ? | IMPORTATION & POSSESSION | PROHIBITED BY WHICH AGENCY: | YEAR LEGALIZED | LEGALIZED BY MEANS OF | ENVRNT IMPACT DOCUMENT ? |
|---------|-----------------------------|--------------------------|-----------------------------|----------------|-----------------------|--------------------------|
| INDIANA | 1995                        | 1                        | NR                          | NR             | NR                    | N/A                      |

RESPONDER'S COMMENTS: FERRETS CAN BE IMPORTED AS LONG AS THEY ARE NOT RELEASED OR SOLD FOR RELEASE.

|      |       |   |    |    |    |     |
|------|-------|---|----|----|----|-----|
| IOWA | NEVER | 1 | NR | NR | NR | N/A |
|------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|        |       |   |    |    |    |     |
|--------|-------|---|----|----|----|-----|
| KANSAS | NEVER | 1 | NR | NR | NR | N/A |
|--------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|          |      |   |                     |    |    |     |
|----------|------|---|---------------------|----|----|-----|
| KENTUCKY | 1942 | 2 | WILDLIFE COMMISSION | NR | NR | N/A |
|----------|------|---|---------------------|----|----|-----|

RESPONDER'S COMMENTS: SEE ATTACHED STATUTE: FERRETS CANNOT BE USED FOR HUNTING "AND FARM PEST CONTROL" (FROM ATTACHED PERMIT TABLE). NO PERSON SHALL KEEP A FERRET, AS A PET, OR FOR ANY PURPOSE, UNLESS HE HAS PROCURED A PERMIT.

|           |       |   |    |    |    |     |
|-----------|-------|---|----|----|----|-----|
| LOUISIANA | NEVER | 1 | NR | NR | NR | N/A |
|-----------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|       |       |   |    |    |    |     |
|-------|-------|---|----|----|----|-----|
| MAINE | NEVER | 1 | NR | NR | NR | N/A |
|-------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|          |      |   |    |    |    |     |
|----------|------|---|----|----|----|-----|
| MARYLAND | 1985 | 1 | NR | NR | NR | N/A |
|----------|------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|               |      |   |    |      |    |   |
|---------------|------|---|----|------|----|---|
| MASSACHUSETTS | 1920 | 3 | NR | 1995 | SL | N |
|---------------|------|---|----|------|----|---|

RESPONDER'S COMMENTS: THEIR USE FOR HUNTING WAS PROHIBITED IN 1874. THEY BECAME ILLEGAL TO POSSESS WITHOUT A PERMIT IN 1920. IMPORTATION & POSSESSION WERE LEGALIZED IN 1995 BY

# DOMESTIC FERRET IMPORTATION & POSSESSION

## IMPORTATION & POSSESSION:

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- NR = no response given (see COMMENTS)

## LEGALIZED BY MEANS OF:

- SL = state legislature
- WCA = wildlife commission action
- WAA = wildlife agency action
- CC = decision based on court case

## ENVRNT IMPACT DOCUMENT:

- Y / N
- NN = not needed
- N/A = not applicable

| STATE                                                               | AGENCY RECEIVED<br>AUTHORITY ? | IMPORTATION &<br>POSSESSION | PROHIBITED BY<br>WHICH AGENCY: | YEAR<br>LEGALIZED | LEGALIZED BY<br>MEANS OF | ENVRNT IMPACT<br>DOCUMENT ? |
|---------------------------------------------------------------------|--------------------------------|-----------------------------|--------------------------------|-------------------|--------------------------|-----------------------------|
| MEANS OF STATE LEGISLATION WITH THE SUPPORT OF THE WILDLIFE AGENCY. |                                |                             |                                |                   |                          |                             |

|          |      |   |    |      |    |     |
|----------|------|---|----|------|----|-----|
| MICHIGAN | 1927 | 3 | NR | 1994 | SL | UNK |
|----------|------|---|----|------|----|-----|

RESPONDER'S COMMENTS: NR

|           |       |   |    |    |    |     |
|-----------|-------|---|----|----|----|-----|
| MINNESOTA | NEVER | 1 | NR | NR | NR | N/A |
|-----------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|             |       |   |    |    |    |     |
|-------------|-------|---|----|----|----|-----|
| MISSISSIPPI | NEVER | 1 | NR | NR | NR | N/A |
|-------------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|          |       |   |    |    |    |     |
|----------|-------|---|----|----|----|-----|
| MISSOURI | NEVER | 1 | NR | NR | NR | N/A |
|----------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|         |       |   |    |    |    |     |
|---------|-------|---|----|----|----|-----|
| MONTANA | NEVER | 1 | NR | NR | NR | N/A |
|---------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|          |       |   |    |    |    |     |
|----------|-------|---|----|----|----|-----|
| NEBRASKA | NEVER | 1 | NR | NR | NR | N/A |
|----------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|        |      |   |    |    |    |     |
|--------|------|---|----|----|----|-----|
| NEVADA | 1947 | 1 | NR | NR | NR | N/A |
|--------|------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

## Appendix B-1

# DOMESTIC FERRET IMPORTATION & POSSESSION

## IMPORTATION & POSSESSION:

- 1 = have never been prohibited by the state
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## LEGALIZED BY MEANS OF:

- SL = state legislature
- WCA = wildlife commission action
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- CC = decision based on court case

## ENVRNT IMPACT DOCUMT:

- Y / N
- NN = not needed
- N/A = not applicable

| STATE         | AGENCY RECEIVED AUTHORITY ? | IMPORTATION & POSSESSION | PROHIBITED BY WHICH AGENCY: | YEAR LEGALIZED | LEGALIZED BY MEANS OF | ENVRNT IMPACT DOCUMENT ? |
|---------------|-----------------------------|--------------------------|-----------------------------|----------------|-----------------------|--------------------------|
| NEW HAMPSHIRE | 1930s                       | 3                        | NR                          | 1993           | SL                    | NN                       |

RESPONDER'S COMMENTS: "[STATE WILDLIFE AGENCY] HAD AUTHORITY [TO REGULATE IMPORTATION AND POSSESSION] PRIOR TO 1993, BUT AUTHORITY WAS TAKEN AWAY AFTER IMPORTATION & POSSESSION WERE LEGALIZED." (PERS. COMMUN. W/RESPONDENT)

|            |      |   |          |    |    |     |
|------------|------|---|----------|----|----|-----|
| NEW JERSEY | 1969 | 2 | WILDLIFE | NR | NR | N/A |
|------------|------|---|----------|----|----|-----|

RESPONDER'S COMMENTS: FOR IMPORTATION AND POSSESSION, ONE MUST HAVE A POSSESSION PERMIT.

|            |      |   |    |    |    |     |
|------------|------|---|----|----|----|-----|
| NEW MEXICO | 1927 | 1 | NR | NR | NR | N/A |
|------------|------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|          |      |   |                      |    |    |     |
|----------|------|---|----------------------|----|----|-----|
| NEW YORK | 1972 | 2 | ENVIRONMENTAL CONSRV | NR | NR | N/A |
|----------|------|---|----------------------|----|----|-----|

RESPONDER'S COMMENTS: LICENSE IS REQUIRED TO POSSESS, SELL, OR BREED FERRETS.

|                |    |   |    |    |    |     |
|----------------|----|---|----|----|----|-----|
| NORTH CAROLINA | ** | 1 | NR | NR | NR | N/A |
|----------------|----|---|----|----|----|-----|

RESPONDER'S COMMENTS: \*\*NO AUTHORIZATION SPECIFIC TO FERRETS. "THE WILDLIFE RESOURCES COMMISSION DOES NOT HAVE JURISDICTION OVER EXOTICS. THE COMMISSION WOULD HAVE AUTHORITY ONLY IF IMPORTATION AND/OR POSSESSION OF DOMESTIC FERRETS AFFECT NATIVE WILDLIFE." (PERS. COMMUN. W/RESPONDENT)

|              |       |   |    |    |    |     |
|--------------|-------|---|----|----|----|-----|
| NORTH DAKOTA | NEVER | 1 | NR | NR | NR | N/A |
|--------------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|      |      |   |    |    |    |     |
|------|------|---|----|----|----|-----|
| OHIO | 1994 | 4 | NR | NR | NR | N/A |
|------|------|---|----|----|----|-----|

RESPONDER'S COMMENTS: OHIO'S WILDLIFE LAWS PROHIBIT POSSESSION OF A FERRET WHILE HUNTING. (BASED ON ATTACHMENT TO SURVEY)

# DOMESTIC FERRET IMPORTATION & POSSESSION

## IMPORTATION & POSSESSION:

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- NR = no response given (see COMMENTS)

## LEGALIZED BY MEANS OF:

- SL = state legislature
- WCA = wildlife commission action
- WAA = wildlife agency action
- CC = decision based on court case

## ENVRNT IMPACT DOCUMENT:

- Y / N
- NN = not needed
- N/A = not applicable

| STATE    | AGENCY RECEIVED<br>AUTHORITY ? | IMPORTATION &<br>POSSESSION | PROHIBITED BY<br>WHICH AGENCY: | YEAR<br>LEGALIZED | LEGALIZED BY<br>MEANS OF | ENVRNT IMPACT<br>DOCUMENT ? |
|----------|--------------------------------|-----------------------------|--------------------------------|-------------------|--------------------------|-----------------------------|
| OKLAHOMA | NEVER                          | 1                           | NR                             | NR                | NR                       | N/A                         |

RESPONDER'S COMMENTS: DEPT OF AG REGULATES IMPORTATION OF DOMESTIC FERRETS BY REQUIRING A HEALTH CERTIFICATE PRIOR TO ENTERING THE STATE.

|        |       |   |    |    |    |     |
|--------|-------|---|----|----|----|-----|
| OREGON | NEVER | 1 | NR | NR | NR | N/A |
|--------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|              |      |   |    |      |    |   |
|--------------|------|---|----|------|----|---|
| PENNSYLVANIA | 1937 | 3 | NR | 1987 | SL | N |
|--------------|------|---|----|------|----|---|

RESPONDER'S COMMENTS: IN 1987, THE NEW LAW EXCLUDED FERRET POSSESSION FROM WILDLIFE LAWS.

|              |           |   |          |    |    |     |
|--------------|-----------|---|----------|----|----|-----|
| RHODE ISLAND | 1929/1981 | 2 | WILDLIFE | NR | NR | N/A |
|--------------|-----------|---|----------|----|----|-----|

RESPONDER'S COMMENTS: SPECIAL CONDITIONS: NEED A PERMIT. OWNER CANNOT HAVE CHILDREN UNDER 2 YRS OLD, RABIES VACCINE, SPAY / NEUTER CERT., \$10 FEE, AND NO RELEASE

|                |       |   |    |    |    |     |
|----------------|-------|---|----|----|----|-----|
| SOUTH CAROLINA | NEVER | 1 | NR | NR | NR | N/A |
|----------------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|              |       |   |    |    |    |     |
|--------------|-------|---|----|----|----|-----|
| SOUTH DAKOTA | NEVER | 1 | NR | NR | NR | N/A |
|--------------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|           |       |   |    |    |    |     |
|-----------|-------|---|----|----|----|-----|
| TENNESSEE | NEVER | 1 | NR | NR | NR | N/A |
|-----------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

|       |       |   |    |    |    |     |
|-------|-------|---|----|----|----|-----|
| TEXAS | NEVER | 1 | NR | NR | NR | N/A |
|-------|-------|---|----|----|----|-----|

RESPONDER'S COMMENTS: NR

## Appendix B-1

# DOMESTIC FERRET IMPORTATION & POSSESSION

| IMPORTATION & POSSESSION:                                                                                                                                                                                                                               |                             |                          | LEGALIZED BY MEANS OF:                                                                                                          |                | ENVRNT IMPACT DOCUMT:                            |                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------------------|--------------------------|
| 1 = have never been prohibited by the state<br>2 = are prohibited, except under special conditions (see COMMENTS)<br>3 = were legalized<br>4 = are not prohibited, except in certain activities (see COMMENTS)<br>NR = no response given (see COMMENTS) |                             |                          | SL = state legislature<br>WCA = wildlife commission action<br>WAA = wildlife agency action<br>CC = decision based on court case |                | Y / N<br>NN = not needed<br>N/A = not applicable |                          |
| STATE                                                                                                                                                                                                                                                   | AGENCY RECEIVED AUTHORITY ? | IMPORTATION & POSSESSION | PROHIBITED BY WHICH AGENCY:                                                                                                     | YEAR LEGALIZED | LEGALIZED BY MEANS OF                            | ENVRNT IMPACT DOCUMENT ? |
| UTAH                                                                                                                                                                                                                                                    | NEVER                       | 3                        | NR                                                                                                                              | 1993           | WAA                                              | N                        |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                |                             |                          |                                                                                                                                 |                |                                                  |                          |
| VERMONT                                                                                                                                                                                                                                                 | UNK                         | 3                        | NR                                                                                                                              | 1989           | SL                                               | N                        |
| RESPONDER'S COMMENTS: FERRETS WERE NOT LEGAL TO IMPORT UNTIL 1989. I PRESUME THEY WERE UNDER OUR JURISDICTION UNTIL THEN. IN 1989, AUTHORITY TO REGULATE WAS GIVEN TO THE DEPT. OF AGRICULTURE.                                                         |                             |                          |                                                                                                                                 |                |                                                  |                          |
| VIRGINIA                                                                                                                                                                                                                                                | 1950                        | 1                        | NR                                                                                                                              | NR             | NR                                               | N/A                      |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                |                             |                          |                                                                                                                                 |                |                                                  |                          |
| WASHINGTON                                                                                                                                                                                                                                              | NEVER                       | 1                        | NR                                                                                                                              | NR             | NR                                               | N/A                      |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                |                             |                          |                                                                                                                                 |                |                                                  |                          |
| WEST VIRGINIA                                                                                                                                                                                                                                           | NEVER                       | 1                        | NR                                                                                                                              | NR             | NR                                               | N/A                      |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                |                             |                          |                                                                                                                                 |                |                                                  |                          |
| WISCONSIN                                                                                                                                                                                                                                               | NEVER                       | 1                        | NR                                                                                                                              | NR             | NR                                               | N/A                      |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                |                             |                          |                                                                                                                                 |                |                                                  |                          |
| WYOMING                                                                                                                                                                                                                                                 | NEVER                       | 1                        | NR                                                                                                                              | NR             | NR                                               | N/A                      |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                |                             |                          |                                                                                                                                 |                |                                                  |                          |



**LEGAL AUTHORITY: WHICH ENTITY(IES) HAS AUTHORITY FOR SETTING STATE REGULATIONS  
REGARDING THE IMPORTATION & POSSESSION OF DOMESTIC FERRETS ?**

|                                             |                             |
|---------------------------------------------|-----------------------------|
| LG = Legislature                            | AG = Agriculture department |
| WC = Wildlife commission                    | HD = Health department      |
| OTHER (see COMMENTS for name of department) |                             |
| NONE (see COMMENTS)                         | NR = no response given      |

| <u>STATE</u> | <u>RESPONDING AGENCY</u>            | <u>WILDLIFE / NATURAL</u> |  | <u>OTHER</u>      |  | <u>RESPONDER'S COMMENTS</u>                                                                                                                  |
|--------------|-------------------------------------|---------------------------|--|-------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------|
|              |                                     | <u>RESOURCES AGENCY ?</u> |  | <u>ENTITIES ?</u> |  |                                                                                                                                              |
| ALABAMA      | GAME & FISH DIVISION, DCNR          | Y                         |  | AG                |  | NR                                                                                                                                           |
| ALASKA       | DIVISION OF WILDLIFE CONSV, DFG     | N                         |  | OTHER             |  | OTHER = DEPT OF ENVIRONMENTAL<br>CONSERVATION                                                                                                |
| ARIZONA      | WILDLIFE MANGT DIVISION, GFD        | N                         |  | AG                |  | NR                                                                                                                                           |
| ARKANSAS     | GAME & FISH COMMISSION              | Y                         |  | LG,AG,HD          |  | WE (GAME & FISH COMMISSION) ONLY HAVE<br>LEGAL AUTHORITY OVER NATIVE WILDLIFE<br>AND SITUATIONS THAT CAN EFFECT THEM.                        |
| CALIFORNIA   | WILDLIFE MANGT DIVISION, DFG        | N                         |  | LG,WC             |  | NR                                                                                                                                           |
| COLORADO     | DIVISION OF WILDLIFE, DNR           | N                         |  | WC                |  | CLASSIFIED AS DOMESTIC-NOT REGULATED                                                                                                         |
| CONNECTICUT  | BUREAU OF NATURAL RESOURCES, DEP    | Y                         |  | LG,AG             |  | CONTACTING THE CT DEPT OF AGRICULTURE<br>MAY PROVIDE YOU WITH ADDITIONAL<br>INFORMATION ABOUT FERRETS<br>PARTICULARLY AS IT CONCERNS RABIES. |
| DELAWARE     | DIVISION OF FISH & WILDLIFE, DNREC  | N                         |  | AG                |  | NR                                                                                                                                           |
| FLORIDA      | GAME & FRESHWATER FISH COMMISSION   | Y                         |  | LG                |  | NR                                                                                                                                           |
| GEORGIA      | WILDLIFE RESOURCES DIVISION, DNR    | Y                         |  | OTHER             |  | OTHER=BOARD OF NATURAL RESOURCES                                                                                                             |
| HAWAII       | DIVISION OF FORESTRY&WILDLIFE, DLNR | N                         |  | AG                |  | NR                                                                                                                                           |
| IDAHO        | WILDLIFE HEALTH LAB, DFG            | N                         |  | NONE              |  | NO PERMITS OR REGS ON FERRETS                                                                                                                |
| ILLINOIS     | DIVISION OF WILDLIFE RESOURCES, DNR | Y                         |  | LG                |  | THE EXISTING REGULATIONS (COPY<br>ENCLOSED) ARE BASED ON AN OUTDATED                                                                         |

**Appendix B-2**

**LEGAL AUTHORITY: WHICH ENTITY(IES) HAS AUTHORITY FOR SETTING STATE REGULATIONS  
REGARDING THE IMPORTATION & POSSESSION OF DOMESTIC FERRETS ?**

|                                             |                             |
|---------------------------------------------|-----------------------------|
| LG = Legislature                            | AG = Agriculture department |
| WC = Wildlife commission                    | HD = Health department      |
| OTHER (see COMMENTS for name of department) |                             |
| NONE (see COMMENTS)                         | NR = no response given      |

| <u>STATE</u>  | <u>RESPONDING AGENCY</u>            | <u>WILDLIFE / NATURAL<br/>RESOURCES AGENCY ?</u> | <u>OTHER<br/>ENTITIES ?</u> | <u>RESPONDER'S COMMENTS</u>                                                                                                                                       |
|---------------|-------------------------------------|--------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| INDIANA       | DIVISION OF FISH & WILDLIFE, DNR    | Y                                                | OTHER                       | OTHER=STATE BOARD OF ANIMAL HEALTH.<br>INDIANA DNR HAS AUTHORITY TO REGULATE<br>EXOTIC SPECIES HOWEVER REGULATINOS<br>GOVERNING FERRETS HAVE NOT BEEN<br>PURSUED. |
| IOWA          | WILDLIFE BUREAU, DNR                | N                                                | NONE                        | NOT PROTECTED OR REGULATED BY ANY<br>AGENCY                                                                                                                       |
| KANSAS        | DEPT OF WILDLIFE & PARKS            | N                                                | HD                          | THEY ARE NOT REGULATED, EXCEPT THE<br>HEALTH DEPARTMENT HAS AUTHORITY IN THE<br>CASE OF POSSIBLE RABIES EXPOSURE.                                                 |
| KENTUCKY      | DEPT OF FISH & WILDLIFE RESOURCES   | N                                                | WC                          | NR                                                                                                                                                                |
| LOUISIANA     | WILDLIFE DIVISION, DWF              | N                                                | LG,AG,HD                    | DO NOT KNOW OF REGULATIONS<br>CONCERNING FERRETS ON A STATEWIDE<br>BASIS                                                                                          |
| MAINE         | DEPT OF INLAND FISHERIES & WILDLIFE | N                                                | LG                          | THERE ARE NO REGULATIONS GOVERNING<br>FERRET IMPORTATION OR POSSESSION                                                                                            |
| MARYLAND      | WILDLIFE & HERITAGE DIVISION, DNR   | Y                                                | OTHER                       | OTHER = LOCAL JURISDICTIONS                                                                                                                                       |
| MASSACHUSETTS | DIVISION OF FISHERIES & WILDLIFE    | Y                                                | NR                          | NR                                                                                                                                                                |
| MICHIGAN      | ANIMAL INDUSTRY DIV, DEPT OF AGRIC  | N                                                | AG, LG                      | STATE WILDLIFE / NATURAL RESOURCES<br>AGENCY = WILDLIFE DIVISION, DNR                                                                                             |

**Appendix B-2**

**LEGAL AUTHORITY: WHICH ENTITY(IES) HAS AUTHORITY FOR SETTING STATE REGULATIONS  
REGARDING THE IMPORTATION & POSSESSION OF DOMESTIC FERRETS ?**

|                                             |                             |
|---------------------------------------------|-----------------------------|
| LG = Legislature                            | AG = Agriculture department |
| WC = Wildlife commission                    | HD = Health department      |
| OTHER (see COMMENTS for name of department) |                             |
| NONE (see COMMENTS)                         | NR = no response given      |

| STATE         | RESPONDING AGENCY<br>DEPT OF NATURAL RESOURCES | WILDLIFE / NATURAL        |                   | OTHER |  | RESPONDER'S COMMENTS                                                                                                                          |
|---------------|------------------------------------------------|---------------------------|-------------------|-------|--|-----------------------------------------------------------------------------------------------------------------------------------------------|
|               |                                                | <u>RESOURCES AGENCY ?</u> | <u>ENTITIES ?</u> |       |  |                                                                                                                                               |
| MINNESOTA     |                                                | N                         | LG                |       |  | NR                                                                                                                                            |
| MISSISSIPPI   | BOARD OF ANIMAL HEALTH, DEPT OF AG             | N                         | OTHER             |       |  | OTHER = MISSISSIPPI BOARD OF ANIMAL HEALTH; STATE WILDLIFE / NATURAL RESOURCES AGENCY = DEPT OF WILDLIFE, FISHERIES, & PARKS                  |
| MISSOURI      | WILDLIFE DIVISION, DEPT OF CONSV               | N                         | HD, OTHER         |       |  | OTHER = LOCAL                                                                                                                                 |
| MONTANA       | WILDLIFE DIVISION, DFWP                        | N                         | LG                |       |  | NEITHER THE DEPT. OF AGRICULTURE OR FWP HAVE CLEAR LAWS ON THE BOOKS PERTAINING TO ANIMALS THAT ARE PART OF THE "PET TRADE"--ONLY "WILDLIFE". |
| NEBRASKA      | GAME & PARKS COMMISSION                        | N                         | LG, AG            |       |  | AG ADDRESSES IMPORT, DISEASES. THE USE OF FERRETS FOR HUNTING IS BANNED.                                                                      |
| NEVADA        | DIVISION OF WILDLIFE                           | N                         | WC                |       |  | NR                                                                                                                                            |
| NEW HAMPSHIRE | WILDLIFE DIVISION, FGD                         | N                         | LG                |       |  | LEGISLATION PASSED IN 1993 TO DECLARE THEM DOMESTIC. WHEN FEDS CHANGE THEIR STATUTES (SIC) WE DID TOO.                                        |
| NEW JERSEY    | DIV OF FISH, GAME, & WILDLIFE, DEP             | Y                         | WC                |       |  | NR                                                                                                                                            |
| NEW MEXICO    | DIVISION OF WILDLIFE, DGF                      | N                         | WC                |       |  | LEGISLATURE SETS GUIDING STATUTES WITH THE COMMISSION PROVIDING REGULATIONS FOR IMPORTATION. IMPORTATION COVERS ALL SPECIES OF WILDLIFE.      |
| NEW YORK      | DEPT OF ENVIRONMENTAL CONSERVATION             | Y                         | OTHER             |       |  | OTHER = NY CITY DEPT OF HEALTH; HEALTH & AG DEPTS MAY ACT IF ISSUES RELATE TO HUMAN HEALTH OR DOMESTIC ANIMALS.                               |

**Appendix B-2**

**LEGAL AUTHORITY: WHICH ENTITY(IES) HAS AUTHORITY FOR SETTING STATE REGULATIONS  
REGARDING THE IMPORTATION & POSSESSION OF DOMESTIC FERRETS ?**

LG = Legislature  
WC = Wildlife commission  
OTHER (see COMMENTS for name of department)  
NONE (see COMMENTS)  
AG = Agriculture department  
HD = Health department  
NR = no response given

| <u>STATE</u>   | <u>RESPONDING AGENCY</u>            | <u>WILDLIFE / NATURAL<br/>RESOURCES AGENCY ?</u> | <u>OTHER<br/>ENTITIES ?</u> | <u>RESPONDER'S COMMENTS</u>                                                                                                                                                                                |
|----------------|-------------------------------------|--------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NORTH CAROLINA | DIVISION OF WILDLIFE MANGT, WRC     | Y                                                | LG,AG,HD                    | WILDLIFE COMMISSION - NATIVE & EXOTIC<br>WILDLIFE. AG DEPT - VETERINARY HEALTH.<br>HEALTH DEPT - HUMAN HEALTH. THESE 4<br>ABOVE [INCL. LEGISLATURE] HAVE SOME<br>AUTHORITY, IF THEY CHOOSE TO EXERCISE IT. |
| NORTH DAKOTA   | STATE GAME & FISH DEPT              | N                                                | OTHER                       | OTHER = STATE VET / BOARD OF ANIMAL<br>HEALTH                                                                                                                                                              |
| OHIO           | WILDLIFE MANGT & RESEARCH, DNR      | N                                                | NONE                        | NR                                                                                                                                                                                                         |
| OKLAHOMA       | GAME DIV, DEPT OF WILDLIFE CONSRV   | N                                                | AG                          | NR                                                                                                                                                                                                         |
| OREGON         | DEPT OF FISH AND WILDLIFE           | N                                                | LG,AG,HD                    | NR                                                                                                                                                                                                         |
| PENNSYLVANIA   | BUREAU OF LAW ENFR, GAME COMMISSION | N                                                | LG,AG                       | NR                                                                                                                                                                                                         |
| RHODE ISLAND   | FISH & WILDLIFE, DEPT OF ENV MANGT  | Y                                                |                             | NR                                                                                                                                                                                                         |
| SOUTH CAROLINA | DEPT OF NATURAL RESOURCES           | N                                                | LG, HD                      | RABIES VECTOR ONLY                                                                                                                                                                                         |
| SOUTH DAKOTA   | GAME, FISH, & PARKS DEPT            | N                                                | AG                          | NR                                                                                                                                                                                                         |
| TENNESSEE      | WILDLIFE RESOURCES AGENCY           | N                                                | LG,AG,HD,WC                 | NR                                                                                                                                                                                                         |
| TEXAS          | WILDLIFE DIV, PARKS & WILDLIFE DEPT | N                                                | LG,HD                       | NR                                                                                                                                                                                                         |
| UTAH           | DIVISION OF WILDLIFE RESOURCES,DNR  | N                                                | WC,HD,OTHER                 | OTHER = COUNTY GOVERNMENTS; THE<br>WILDLIFE BOARD TURNED CONTROL OF<br>FERRETS OVER TO LOCAL GOVERNMENTS.                                                                                                  |

**Appendix B-2**

LEGAL AUTHORITY: WHICH ENTITY(IES) HAS AUTHORITY FOR SETTING STATE REGULATIONS  
REGARDING THE IMPORTATION & POSSESSION OF DOMESTIC FERRETS ?

LG = Legislature  
WC = Wildlife commission  
OTHER (see COMMENTS for name of department)  
NONE (see COMMENTS)

AG = Agriculture department  
HD = Health department  
NR = no response given

| STATE<br>VERMONT | RESPONDING AGENCY<br>DEPT OF FISH & WILDLIFE, ANR | WILDLIFE / NATURAL        |   | OTHER             |    | RESPONDER'S COMMENTS                                                                                                                            |
|------------------|---------------------------------------------------|---------------------------|---|-------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |                                                   | <u>RESOURCES AGENCY ?</u> | N | <u>ENTITIES ?</u> | AG |                                                                                                                                                 |
| VIRGINIA         | DEPT OF GAME & INLAND FISHERIES                   |                           | Y |                   |    | DEPT WAS GRANTED THAT AUTHORITY BY<br>THE LEGISLATURE.                                                                                          |
| WASHINGTON       | ENFORCEMENT, DEPT OF FISH & WILDLIFE              |                           | N | LG                |    | WDFW AUTHORITY IS LIMITED TO THOSE<br>SPECIES CLASSIFIED AS WILDLIFE AND<br>DELETERIOUS EXOTIC WILDLIFE. FERRETS<br>ARE NOT INCLUDED IN EITHER. |
| WEST VIRGINIA    | WILDLIFE RESOURCES SECTION, DNR                   |                           | N | AG                |    | NR                                                                                                                                              |
| WISCONSIN        | BUREAU OF WILDLIFE MANAGEMENT, DNR                |                           | Y | LG, AG, HD        |    | NR                                                                                                                                              |
| WYOMING          | GAME & FISH DEPT                                  |                           | N | WC                |    | NR                                                                                                                                              |

ANSWERS: STATE WILDLIFE AGENCY HAS AUTHORITY TO ENFORCE FERRET LAWS  
AND REGULATIONS FOR THE FOLLOWING ACTIVITIES:

| STATE       | IMPORTATION | POSSESSION | HUNTING | BREEDING | RESPONDER'S COMMENTS                                                                                                                                   | STATE HAS<br>REGULATIONS WHICH<br>PROHIBIT RELEASE? | RESPONDER IS<br>AWARE OF LOCAL<br>GOVT. ORDINANCES? |
|-------------|-------------|------------|---------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| ALABAMA     | NR          | NR         | NR      | NR       | NO LAWS OR REGS EXIST TO REGULATE<br>THESE ACTIVITIES.                                                                                                 | N                                                   | N                                                   |
| ALASKA      | N           | N          | Y       | N        | NR                                                                                                                                                     | Y                                                   | N                                                   |
| ARIZONA     | N           | N          | Y       | N        | NR                                                                                                                                                     | Y                                                   | N                                                   |
| ARKANSAS    | N           | N          | Y       | N        | NR                                                                                                                                                     | Y                                                   | N                                                   |
| CALIFORNIA  | Y           | Y          | Y       | Y        | NR                                                                                                                                                     | Y                                                   | N                                                   |
| COLORADO    | N           | N          | N       | N        | NR                                                                                                                                                     | N                                                   | N                                                   |
| CONNECTICUT | Y           | Y          | Y       | Y        | NR                                                                                                                                                     | N                                                   | N                                                   |
| DELAWARE    | N           | N          | N       | N        | NR                                                                                                                                                     | N                                                   | N                                                   |
| FLORIDA     | Y           | Y          | Y       | Y        | NR                                                                                                                                                     | Y                                                   | N                                                   |
| GEORGIA     | Y           | Y          | Y       | Y        | NR                                                                                                                                                     | Y                                                   | Y                                                   |
| HAWAII      | N           | N          | Y       | N        | DLNR ENFORCEMENT AGENTS HAVE<br>BROAD POLICE POWERS THAT THEY<br>COULD ENFORCE OTHER AGENCY<br>REGULATIONS, BUT WOULD TYPICALLY<br>REFER CASE TO HDOA. | Y                                                   | N                                                   |
| IDAHO       | N           | N          | N       | N        | NR                                                                                                                                                     | Y                                                   | N                                                   |
| ILLINOIS    | Y           | Y          | Y       | Y        | THE FERRET TRADE IN ILLINOIS IS<br>CONFINED TO RAISING AND SALE OF<br>FERRETS FOR PETS.                                                                | N                                                   | N                                                   |
| INDIANA     | Y           | Y          | Y       | Y        | NR                                                                                                                                                     | N                                                   | Y                                                   |
| IOWA        | N           | N          | Y       | N        | NR                                                                                                                                                     | Y                                                   | N                                                   |
| KANSAS      | N           | N          | N       | N        | CONSIDERED DOMESTIC ANIMALS SO                                                                                                                         | N                                                   | N                                                   |

Appendix B-3



**ANSWERS: STATE WILDLIFE AGENCY HAS AUTHORITY TO ENFORCE FERRET LAWS  
AND REGULATIONS FOR THE FOLLOWING ACTIVITIES:**

| <u>STATE</u>  | <u>IMPORTATION</u> | <u>POSSESSION</u> | <u>HUNTING</u> | <u>BREEDING</u> | <u>RESPONDER'S COMMENTS</u><br>NO AUTHORITY GIVEN TO WILDLIFE<br>[DEPARTMENT].                                                                                                                                                                                                                                                                       | <u>STATE HAS</u><br>REGULATIONS WHICH<br><u>PROHIBIT RELEASE?</u> | <u>RESPONDER IS</u><br>AWARE OF LOCAL<br><u>GOVT. ORDINANCES?</u> |
|---------------|--------------------|-------------------|----------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------|
| KENTUCKY      | Y                  | Y                 | Y              | Y               | NR                                                                                                                                                                                                                                                                                                                                                   | N                                                                 | N                                                                 |
| LOUISIANA     | N                  | N                 | Y              | N               | NR                                                                                                                                                                                                                                                                                                                                                   | N                                                                 | N                                                                 |
| MAINE         | N                  | N                 | N              | N               | NR                                                                                                                                                                                                                                                                                                                                                   | N                                                                 | N                                                                 |
| MARYLAND      | Y                  | Y                 | Y              | N               | NR                                                                                                                                                                                                                                                                                                                                                   | N                                                                 | N                                                                 |
| MASSACHUSETTS | Y                  | Y                 | Y              | Y               | THIS AUTHORITY COMES FROM BROAD<br>WORDING IN ONE OF OUR AGENCY'S<br>EARLY STATUTES. IT IS REPEATED<br>MORE CLEARLY ON PERMITS AND<br>OTHER AGENCY DOCUMENTS. MGL.<br>131:77 REFERS SPECIFICALLY TO<br>FERRETS. THE LIBERATION OF ANY<br>VERTEBRATE SPECIES WITHOUT A<br>PERMIT IS PROHIBITED HOWEVER IT IS<br>SELDOM ENFORCED FOR DOGS AND<br>CATS. | Y                                                                 | N                                                                 |
| MICHIGAN      | N                  | N                 | Y              | N               | NR                                                                                                                                                                                                                                                                                                                                                   | Y                                                                 | N                                                                 |
| MINNESOTA     | N                  | N                 | Y              | N               | NR                                                                                                                                                                                                                                                                                                                                                   | N                                                                 | N                                                                 |
| MISSISSIPPI   | N                  | N                 | Y              | N               | NR                                                                                                                                                                                                                                                                                                                                                   | N                                                                 | N                                                                 |
| MISSOURI      | N                  | N                 | Y              | N               | [STATE WILDLIFE AGENCY] HAS THE<br>AUTHORITY BUT CHOOSES NOT TO<br>EXERCISE IT.                                                                                                                                                                                                                                                                      | Y                                                                 | Y                                                                 |
| MONTANA       | N                  | N                 | N              | N               | NR                                                                                                                                                                                                                                                                                                                                                   | Y                                                                 | N                                                                 |
| NEBRASKA      | N                  | N                 | Y              | N               | [SWA DOES NOT HAVE AUTHORITY TO<br>ENFORCE FERRET LAWS AND<br>REGULATIONS FOR POSSESSION]<br>EXCEPT AS RELATED TO HUNTING.                                                                                                                                                                                                                           | Y                                                                 | N                                                                 |

**Appendix B-3**

ANSWERS: STATE WILDLIFE AGENCY HAS AUTHORITY TO ENFORCE FERRET LAWS  
AND REGULATIONS FOR THE FOLLOWING ACTIVITIES:

| <u>STATE</u>   | <u>IMPORTATION</u> | <u>POSSESSION</u> | <u>HUNTING</u> | <u>BREEDING</u> | <u>RESPONDER'S COMMENTS</u>                                                                                                                                                  | <u>STATE HAS<br/>REGULATIONS WHICH<br/>PROHIBIT RELEASE?</u> | <u>RESPONDER IS<br/>AWARE OF LOCAL<br/>GOVT. ORDINANCES?</u> |
|----------------|--------------------|-------------------|----------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|
| NEVADA         | Y                  | Y                 | Y              | Y               | NR                                                                                                                                                                           | Y                                                            | N                                                            |
| NEW HAMPSHIRE  | N                  | N                 | Y              | N               | CANNOT BE USED FOR HUNTING.                                                                                                                                                  | N                                                            | NR                                                           |
| NEW JERSEY     | Y                  | Y                 | Y              | Y               | NR                                                                                                                                                                           | Y                                                            | N                                                            |
| NEW MEXICO     | Y                  | N                 | N              | N               | NR                                                                                                                                                                           | N                                                            | N                                                            |
| NEW YORK       | Y                  | Y                 | Y              | Y               | NR                                                                                                                                                                           | Y                                                            | N                                                            |
| NORTH CAROLINA | Y                  | Y                 | N              | N               | [STATE WILDLIFE AGENCY HAS<br>AUTHORITY OVER IMPORTATION OR<br>POSSESSION ONLY] IF FERRETS ARE<br>INIMICAL TO NATIVE WILDLIFE.<br>[AUTHORITY IS] NOT SPECIFIC TO<br>FERRETS. | N                                                            | N                                                            |
| NORTH DAKOTA   | N                  | N                 | N              | N               | NR                                                                                                                                                                           | N                                                            | N                                                            |
| OHIO           | N                  | N                 | N              | N               | NR                                                                                                                                                                           | N                                                            | Y                                                            |
| OKLAHOMA       | N                  | N                 | Y              | N               | NR                                                                                                                                                                           | N                                                            | N                                                            |
| OREGON         | N                  | N                 | Y              | N               | NR                                                                                                                                                                           | Y                                                            | N                                                            |
| PENNSYLVANIA   | Y                  | N                 | Y              | N               | NR                                                                                                                                                                           | N                                                            | N                                                            |
| RHODE ISLAND   | Y                  | Y                 | Y              | Y               | NR                                                                                                                                                                           | Y                                                            | N                                                            |
| SOUTH CAROLINA | N                  | N                 | N              | N               | NR                                                                                                                                                                           | N                                                            | N                                                            |
| SOUTH DAKOTA   | N                  | N                 | N              | N               | NR                                                                                                                                                                           | N                                                            | N                                                            |
| TENNESSEE      | NR                 | NR                | NR             | NR              | NO LAWS PERTAINING TO FERRETS<br>EXIST AT THIS TIME.                                                                                                                         | Y                                                            | N                                                            |
| TEXAS          | N                  | N                 | N              | N               | NR                                                                                                                                                                           | N                                                            | Y                                                            |

Appendix B-3

ANSWERS: STATE WILDLIFE AGENCY HAS AUTHORITY TO ENFORCE FERRET LAWS  
AND REGULATIONS FOR THE FOLLOWING ACTIVITIES:

| <u>STATE</u>  | <u>IMPORTATION</u> | <u>POSSESSION</u> | <u>HUNTING</u> | <u>BREEDING</u> | <u>RESPONDER'S COMMENTS</u> | STATE HAS<br>REGULATIONS WHICH<br><u>PROHIBIT RELEASE?</u> | RESPONDER IS<br>AWARE OF LOCAL<br><u>GOVT. ORDINANCES?</u> |
|---------------|--------------------|-------------------|----------------|-----------------|-----------------------------|------------------------------------------------------------|------------------------------------------------------------|
| UTAH          | N                  | N                 | Y              | N               | NR                          | Y                                                          | NR                                                         |
| VERMONT       | N                  | N                 | N              | N               | NR                          | N                                                          | N                                                          |
| VIRGINIA      | Y                  | Y                 | Y              | Y               | NR                          | Y                                                          | N                                                          |
| WASHINGTON    | N                  | N                 | N              | N               | NR                          | Y                                                          | N                                                          |
| WEST VIRGINIA | N                  | N                 | Y              | N               | NR                          | N                                                          | N                                                          |
| WISCONSIN     | N                  | N                 | N              | N               | NR                          | N                                                          | NR                                                         |
| WYOMING       | N                  | N                 | N              | N               | NR                          | N                                                          | N                                                          |

Appendix B-3

**PERMITS: WHICH ENTITY HAS AUTHORITY FOR ISSUING PERMITS TO POSSESS DOMESTIC FERRETS FOR THE FOLLOWING ACTIVITIES ?**

SWC = state wildlife commission  
SAA = state agriculture agency  
SHA = state health agency  
SWNRA = state wildlife/natural resources agency

LCG = local government  
FED = federal agencies (i.e., USDA)  
PS = prohibited statewide

OTHER (see COMMENTS for name)  
NR = no response given (see COMMENTS)  
N/A = not applicable (see COMMENTS)

| STATE   | IMPORTATION | HUNTING | FARM         | LAB    | PET | BREEDING |
|---------|-------------|---------|--------------|--------|-----|----------|
|         | NR          | NR      | PEST CONTROL | ANIMAL | NR  | NR       |
| ALABAMA |             |         |              |        |     |          |

RESPONDER'S COMMENTS: NO PERMITS REQUIRED

| ALASKA | OTHER | SWC | OTHER | OTHER | OTHER |
|--------|-------|-----|-------|-------|-------|
|        |       |     |       |       |       |

RESPONDER'S COMMENTS: OTHER = DEPT OF ENVIRONMENTAL CONSERVATION; "NO STATE PERMITS ARE REQUIRED BECAUSE THE FERRET IS CLASSIFIED AS A DOMESTIC ANIMAL." (PERS. COMMUN. W/RESPONDENT)

| ARIZONA | SAA | SAA | SAA | SAA | SAA |
|---------|-----|-----|-----|-----|-----|
|         |     |     |     |     |     |

RESPONDER'S COMMENTS: NR

| ARKANSAS | N/A | PS | PS | FED | NR | FED |
|----------|-----|----|----|-----|----|-----|
|          |     |    |    |     |    |     |

RESPONDER'S COMMENTS: TO MY KNOWLEDGE NO PERMIT IS REQUIRED IN ARKANSAS OTHER THAN HEALTH CERTIFICATION. "NO PERMIT IS REQUIRED TO POSSESS A FERRET AS A PET. HUNTING IS PROHIBITED SINCE THIS IS NOT LISTED AS A LEGAL MEANS OF TAKE IN THE STATE'S REGULATIONS. USE AS A PEST CONTROL WOULD BE PROHIBITED UNDER THE STATE REGULATION WHICH PROHIBITS THE RELEASE OF EXOTICS." (PERS. COMMUN. W/RESPONDENT). "ONLY A HEALTH CERT. IS REQUIRED TO IMPORT A FERRET" (PERS. COMMUN. W/ARKANSAS LIVESTOCK & POULTRY COMMISSION).

| CALIFORNIA | SWC | PS | PS | SWC | SWC | SWC |
|------------|-----|----|----|-----|-----|-----|
|            |     |    |    |     |     |     |

RESPONDER'S COMMENTS: NR

| COLORADO | NR | NR | NR | NR | LCG | SAA |
|----------|----|----|----|----|-----|-----|
|          |    |    |    |    |     |     |

RESPONDER'S COMMENTS: NO RESTRICTIONS. PET CARE ACT REGULATES COMMERCIAL TRADE IN ANY SPECIES. "THIS ACT WAS INITIATED BY THE DEPT. OF AGRICULTURE TO REGULATE BREEDING FOR COMMERCIAL USES. BREEDERS NEED A STATE AG. LICENSE." (PERS. COMMUN. W/RESPONDENT).

| CONNECTICUT | SWNRA | PS | NR | NR | SWNRA, SAA | SWNRA, SAA |
|-------------|-------|----|----|----|------------|------------|
|             |       |    |    |    |            |            |

RESPONDER'S COMMENTS: NR

| DELAWARE | SAA | SWNRA | SAA | SAA | SAA | SAA |
|----------|-----|-------|-----|-----|-----|-----|
|          |     |       |     |     |     |     |

RESPONDER'S COMMENTS: NR

**Appendix B-4**

PERMITS: WHICH ENTITY HAS AUTHORITY FOR ISSUING PERMITS TO POSSESS DOMESTIC FERRETS FOR THE FOLLOWING ACTIVITIES ?

SWC = state wildlife commission  
SAA = state agriculture agency  
SHA = state health agency  
SWNRA = state wildlife/natural resources agency

LCG = local government  
FED = federal agencies (i.e., USDA)  
PS = prohibited statewide

OTHER (see COMMENTS for name)  
NR = no response given (see COMMENTS)  
N/A = not applicable (see COMMENTS)

**STATE**  
**FLORIDA**

**IMPORTATION** SWC  
**HUNTING** PS  
**FARM** PS  
**LAB** ANIMAL  
**PET** SWC  
**BREEDING** SWC

RESPONDER'S COMMENTS: PERMIT REQUIRED FOR SALE OR EXHIBITION. NO PERMIT REQUIRED FOR USE AS PERSONAL PET. "HUNTING AND USE AS A PEST CONTROL -- PROHIBITED BY REGULATIONS THAT DO NOT LIST THE FERRET AS A LEGAL METHOD FOR THESE ACTIVITIES. COMMISSION ENFORCES THESE REGULATIONS. LABS NEED TO OBTAIN A PERMIT FROM THE USDA. (FED = USDA)." (PERS. COMMUN. W/RESPONDENT)

**GEORGIA** SWNRA PS PS SWNRA, FED LCG SWNRA

RESPONDER'S COMMENTS: FED = USDA

**HAWAII** SAA PS PS SAA PS PS

RESPONDER'S COMMENTS: FERRETS ARE A RESTRICTED ANIMAL IN HAWAII. IMPORTATION AND POSSESSION IS ALLOWED BY PERMIT ONLY FOR RESEARCH, EXHIBITION IN MUNICIPAL ZOOS.

**IDAHO** N/A NR NR NR NR

RESPONDER'S COMMENTS: PETS IN IDAHO. "HEALTH CERTIFICATE REQUIRED TO IMPORT FERRETS INTO IDAHO; NO PERMITS OR REGULATIONS ON FERRETS" (PERS. COMMENT BASED ON RESPONSE IN QUESTIONNAIRE)

**ILLINOIS** SWNRA SWNRA, PS SWNRA SWNRA SWNRA

RESPONDER'S COMMENTS: THE ONLY REGULATIONS PERTAINING TO FERRETS ARE: 1) 17 ADMIN. CODE PART 630, AND 2) 520 ILCS (ILLINOIS CODIFIED STATUTES) 5/3.23. THE LATTER IS OUTDATED; PERSONS WANTING TO HOLD A FERRET FOR A PET GET A "FREE" CLASS A PERMIT AND THOSE WHO RAISE AND SELL FERRETS NEED A CLASS B PERMIT.

**INDIANA** SWC NR NR NR LCG NR

RESPONDER'S COMMENTS: "NONE OF THESE ACTIVITIES ARE PROHIBITED" (PERS. COMMUN. W/RESPONDENT)

**IOWA** NR SWNRA NR NR NR NR

RESPONDER'S COMMENTS: DNR RESTRICTS USE OF FERRETS FOR HUNTING, BUT DOESN'T REGULATE IMPORT, POSSESSION, OR BREEDING.

**KANSAS** NR NR NR NR NR NR

RESPONDER'S COMMENTS: NO PERMITS REQUIRED

Appendix B-4

**PERMITS: WHICH ENTITY HAS AUTHORITY FOR ISSUING PERMITS TO POSSESS DOMESTIC FERRETS FOR THE FOLLOWING ACTIVITIES ?**

|                                                 |                                     |                                       |
|-------------------------------------------------|-------------------------------------|---------------------------------------|
| SWC = state wildlife commission                 | LCG = local government              | OTHER (see COMMENTS for name)         |
| SAA = state agriculture agency                  | FED = federal agencies (i.e., USDA) | NR = no response given (see COMMENTS) |
| SHA = state health agency                       | PS = prohibited statewide           | N/A = not applicable (see COMMENTS)   |
| SWNRA = state wildlife/natural resources agency |                                     |                                       |

| <u>STATE</u>                                                                                                                                                                                                                                                          | <u>FARM</u>        |                |                     | <u>LAB</u>    |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------|---------------------|---------------|------------|
|                                                                                                                                                                                                                                                                       | <u>IMPORTATION</u> | <u>HUNTING</u> | <u>PEST CONTROL</u> | <u>ANIMAL</u> | <u>PET</u> |
| KENTUCKY                                                                                                                                                                                                                                                              | SWNRA              | PS             | PS                  | SWNRA         | SWNRA      |
| RESPONDER'S COMMENTS: AN OLD STATUTE EXISTS, ENACTED IN 1942, AND AMENDED IN 1952, WHICH APPLIES TO FERRETS (SEE ATTACHED). UNLIKE THE WORDING IN THE STATUTE, WE DO NOT ISSUE "FERRET PERMITS", THOUGH WE DO ISSUE WILDLIFE PET PERMITS WHICH ALSO APPLY TO FERRETS. |                    |                |                     |               |            |
| LOUISIANA                                                                                                                                                                                                                                                             | SAA, SHA           | SWC, PS        | SAA                 | SHA, LCG      | LCG        |
| RESPONDER'S COMMENTS: FERRETS ARE NOT LISTED AS A LEGAL METHOD OF TAKE FOR HUNTING & AS SUCH ARE NOT PERMITTED FOR HUNTING. THEY ARE NOT EXPLICITLY PROHIBITED.                                                                                                       |                    |                |                     |               |            |
| MAINE                                                                                                                                                                                                                                                                 | NR                 | NR             | NR                  | NR            | NR         |
| RESPONDER'S COMMENTS: PERMITS ARE NOT NECESSARY                                                                                                                                                                                                                       |                    |                |                     |               |            |
| MARYLAND                                                                                                                                                                                                                                                              | NR                 | NR             | NR                  | NR            | NR         |
| RESPONDER'S COMMENTS: MD IS NOT CURRENTLY ISSUING PERMITS FOR FERRETS. THEY ARE LEGAL TO IMPORT AND POSSESS IN THIS STATE.                                                                                                                                            |                    |                |                     |               |            |
| MASSACHUSETTS                                                                                                                                                                                                                                                         | NR                 | PS             | PS                  | NR            | SWNRA      |
| RESPONDER'S COMMENTS: FERRETS MAY BE IMPORTED, KEPT AS PETS, AND USED AS LAB ANIMALS WITH NO PERMIT REQUIRED. HOWEVER, THERE ARE RESTRICTIONS ON THESE ACTIVITIES.                                                                                                    |                    |                |                     |               |            |
| MICHIGAN                                                                                                                                                                                                                                                              | SAA                | SWC            | SWC                 | SAA           | SAA        |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                              |                    |                |                     |               |            |
| MINNESOTA                                                                                                                                                                                                                                                             | NR                 | SWNRA          | NR                  | NR            | NR         |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                              |                    |                |                     |               |            |
| MISSISSIPPI                                                                                                                                                                                                                                                           | NR                 | NR             | NR                  | NR            | NR         |
| RESPONDER'S COMMENTS: NO PERMIT REQUIRED                                                                                                                                                                                                                              |                    |                |                     |               |            |
| MISSOURI                                                                                                                                                                                                                                                              | LCG                | SWC            | NR                  | NR            | LCG        |
| RESPONDER'S COMMENTS: DO NOT KNOW WHICH ENTITY WOULD HAVE AUTHORITY TO ISSUE PERMITS FOR FARM PEST CONTROL OR LAB USE. "LOCAL GOV'T MIGHT HAVE THE AUTHORITY TO ISSUE PERMITS FOR BREEDING." (PERS. COMMUN. W/RESPONDENT)                                             |                    |                |                     |               |            |

**Appendix B-4**



**PERMITS: WHICH ENTITY HAS AUTHORITY FOR ISSUING PERMITS TO POSSESS DOMESTIC FERRETS FOR THE FOLLOWING ACTIVITIES ?**

SWC = state wildlife commission  
 SAA = state agriculture agency  
 SHA = state health agency  
 SWNRA = state wildlife/natural resources agency

LCG = local government  
 FED = federal agencies (i.e., USDA)  
 PS = prohibited statewide

OTHER (see COMMENTS for name)  
 NR = no response given (see COMMENTS)  
 N/A = not applicable (see COMMENTS)

| <u>STATE</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <u>IMPORTATION</u> | <u>HUNTING</u> | <u>FARM</u><br><u>PEST CONTROL</u> | <u>LAB</u><br><u>ANIMAL</u> | <u>PET</u>    | <u>BREEDING</u> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------|------------------------------------|-----------------------------|---------------|-----------------|
| <b>MONTANA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | NR                 | NR             | NR                                 | NR                          | NR            | NR              |
| RESPONDER'S COMMENTS: EXISTING STATUTES ADDRESS "WILDLIFE", NOT "PETS"                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                |                                    |                             |               |                 |
| <b>NEBRASKA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SAA                | PS             | PS                                 | NR                          | NR            | NR              |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                |                                    |                             |               |                 |
| <b>NEVADA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SWNRA              | SWNRA          | NR                                 | SAA                         | SWNRA,SHA,LCG | SWNRA           |
| RESPONDER'S COMMENTS: "HAVE NO INFORMATION FOR USE AS A FARM PEST CONTROL." (PERS. COMMUN. W/RESPONDENT)                                                                                                                                                                                                                                                                                                                                                                                         |                    |                |                                    |                             |               |                 |
| <b>NEW HAMPSHIRE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | NR                 | PS             | NR                                 | NR                          | NR            | NR              |
| RESPONDER'S COMMENTS: NO PERMITS REQUIRED                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                |                                    |                             |               |                 |
| <b>NEW JERSEY</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | SWNRA              | PS             | SWNRA                              | SWNRA                       | SWNRA         | SWNRA           |
| RESPONDER'S COMMENTS: VARIOUS LOCAL GOVTS. MAY ALSO REGULATE POSSESSION.                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                |                                    |                             |               |                 |
| <b>NEW MEXICO</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | NR                 | NR             | NR                                 | NR                          | NR            | NR              |
| RESPONDER'S COMMENTS: PERMITS ARE NOT REQUIRED FOR POSSESSION.                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                |                                    |                             |               |                 |
| <b>NEW YORK</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SWNRA              | PS             | SWNRA                              | SWNRA                       | SWNRA         | SWNRA           |
| RESPONDER'S COMMENTS: "HUNTING WITH FERRETS IS PROHIBITED. STATE WILDLIFE AGENCY REGULATES THE POSSESSION OF FERRETS FOR ALL OF THESE ACTIVITIES." (PERS. COMMUN. W/RESPONDENT)                                                                                                                                                                                                                                                                                                                  |                    |                |                                    |                             |               |                 |
| <b>NORTH CAROLINA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | SWC                | SWC            | SWC                                | SWC                         | SWC           | SWC             |
| RESPONDER'S COMMENTS: ENTRIES MADE AFTER PERS. COMMUN. W/RESPONDENT. "WILDLIFE RESOURCES COMMISSION HAS AUTHORITY TO ISSUE PERMITS BUT CHOOSES NOT TO USE IT. IMPORTATION OF A FERRET WOULD REQUIRE A HEALTH CERTIFICATE FROM THE DEPT. OF AG. HUNTING WOULD BE ILLEGAL IF THE FERRET TOOK THE PREY. THIS IS NOT LISTED AS A LEGAL MEANS OF TAKE IN THEIR STATE REGULATIONS. THERE IS NO RESTRICTION ON USING FERRETS TO CHASE PREY FROM BURROWS FOR THE HUNTER..." (PERS. COMMUN. W/RESPONDENT) |                    |                |                                    |                             |               |                 |

**Appendix B-4**

**PERMITS: WHICH ENTITY HAS AUTHORITY FOR ISSUING PERMITS TO POSSESS DOMESTIC FERRETS FOR THE FOLLOWING ACTIVITIES ?**

SWC = state wildlife commission  
 SAA = state agriculture agency  
 SHA = state health agency  
 SWNRA = state wildlife/natural resources agency

LCG = local government  
 FED = federal agencies (i.e., USDA)  
 PS = prohibited statewide

OTHER (see COMMENTS for name)  
 NR = no response given (see COMMENTS)  
 N/A = not applicable (see COMMENTS)

| STATE        | FARM        |         |              | LAB    |     |       | BREEDING |
|--------------|-------------|---------|--------------|--------|-----|-------|----------|
|              | IMPORTATION | HUNTING | PEST CONTROL | ANIMAL | PET | OTHER |          |
| NORTH DAKOTA | NR          | NR      | NR           | NR     | NR  |       |          |

RESPONDER'S COMMENTS: OTHER = BOARD OF ANIMAL HEALTH. THE GAME & FISH DEPT HAS NO CONTROL OVER DOMESTIC WILDLIFE AT THIS TIME. "THE BOARD OF ANIMAL HEALTH MAY ALSO HAVE AUTHORITY TO ISSUE PERMITS FOR BREEDING. SINCE THEY DO REQUIRE PERMITS FOR BREEDING EXOTIC SPECIES. (FERRETS ARE CLASSIFIED AS DOMESTIC.) THE BOARD MAY ALSO HAVE AUTHORITY OVER THE OTHER ACTIVITIES." (PERS. COMMUN. W/RESPONDENT)

| OHIO | LCG | PS | LCG | LCG | LCG | LCG |
|------|-----|----|-----|-----|-----|-----|
|      |     |    |     |     |     |     |

RESPONDER'S COMMENTS: "THE LOCAL GOVERNMENTS WILL MOST LIKELY HAVE AUTHORITY TO ISSUE PERMITS FOR THESE ACTIVITIES." (PERS. COMMUN. W/RESPONDENT)

| OKLAHOMA | N/A | PS | NR | NR | NR | NR |
|----------|-----|----|----|----|----|----|
|          |     |    |    |    |    |    |

RESPONDER'S COMMENTS: "STATE AGRICULTURE AGENCY REQUIRES A HEALTH CERT. PRIOR TO BRINGING THE FERRET INTO THE STATE." (COVER LETTER AND PERS. COMMUN. W/RESPONDENT)

| OREGON | SAA | SWC, SWNRA | NR | NR | NR | NR |
|--------|-----|------------|----|----|----|----|
|        |     |            |    |    |    |    |

RESPONDER'S COMMENTS: "IMPORT PERMIT IS REQUIRED BY THE DEPT OF AG. NONE OF THESE ACTIVITIES ARE PROHIBITED." (PERS. COMMUN. W/RESPONDENT)

| PENNSYLVANIA | SWNRA | PS | PS | NR | NR | NR |
|--------------|-------|----|----|----|----|----|
|              |       |    |    |    |    |    |

RESPONDER'S COMMENTS: "NO PERMIT IS REQUIRED TO POSSESS A FERRET IN THE STATE. FERRETS CAN NOT BE IMPORTED FOR PET TRADE OR BY INDIVIDUALS OWNERS. ZOOS, WILDLIFE PROPAGATORS, RESEARCHERS CAN APPLY FOR AN IMPORT PERMIT FROM THE GAME COMMISSION." (PERS. COMMUN. W/RESPONDENT)

| RHODE ISLAND | SWNRA | PS | PS | SWNRA | SWNRA | PS |
|--------------|-------|----|----|-------|-------|----|
|              |       |    |    |       |       |    |

RESPONDER'S COMMENTS: NR

| SOUTH CAROLINA | N/A | N/A | N/A | N/A | N/A | N/A |
|----------------|-----|-----|-----|-----|-----|-----|
|                |     |     |     |     |     |     |

RESPONDER'S COMMENTS: [IT'S] ONLY ILLEGAL TO SELL FERRETS AS PETS. [THIS] IS A HEALTH DEPT LAW.

| SOUTH DAKOTA | NR | NR | NR | NR | NR | NR |
|--------------|----|----|----|----|----|----|
|              |    |    |    |    |    |    |

RESPONDER'S COMMENTS: DOMESTIC FERRETS ARE NOT PART OF [THE DEPT'S] AUTHORITY.

**Appendix B-4**

**PERMITS: WHICH ENTITY HAS AUTHORITY FOR ISSUING PERMITS TO POSSESS DOMESTIC FERRETS FOR THE FOLLOWING ACTIVITIES ?**

SWC = state wildlife commission  
 SAA = state agriculture agency  
 SHA = state health agency  
 SWNRA = state wildlife/natural resources agency

LCG = local government  
 FED = federal agencies (i.e., USDA)  
 PS = prohibited statewide

OTHER (see COMMENTS for name)  
 NR = no response given (see COMMENTS)  
 N/A = not applicable (see COMMENTS)

| STATE     | IMPORTATION |  | HUNTING |  | FARM |  | LAB |  | PET |  | BREEDING |  |
|-----------|-------------|--|---------|--|------|--|-----|--|-----|--|----------|--|
|           | NR          |  | NR      |  | NR   |  | NR  |  | NR  |  | NR       |  |
| TENNESSEE |             |  |         |  |      |  |     |  |     |  |          |  |

RESPONDER'S COMMENTS: NO PERMITS REQUIRED FOR POSSESSION OF FERRETS

|       |     |    |    |    |    |     |    |
|-------|-----|----|----|----|----|-----|----|
| TEXAS | SHA | NR | NR | NR | NR | LCG | NR |
|-------|-----|----|----|----|----|-----|----|

RESPONDER'S COMMENTS: DOMESTIC FERRETS ARE NOT REGULATED AS "WILDLIFE" BY THE STATE OF TEXAS.

|      |     |           |     |     |     |     |
|------|-----|-----------|-----|-----|-----|-----|
| UTAH | SHA | SWC,SWNRA | SAA | SHA | LCG | LCG |
|------|-----|-----------|-----|-----|-----|-----|

RESPONDER'S COMMENTS: NR

|         |     |    |     |     |     |
|---------|-----|----|-----|-----|-----|
| VERMONT | SAA | PS | SAA | SAA | SAA |
|---------|-----|----|-----|-----|-----|

RESPONDER'S COMMENTS: NR

|          |       |           |         |    |    |       |
|----------|-------|-----------|---------|----|----|-------|
| VIRGINIA | SWNRA | SWNRA, PS | SAA, PS | NR | NR | SWNRA |
|----------|-------|-----------|---------|----|----|-------|

RESPONDER'S COMMENTS: [DEPT OF GAME & INLAND FISHERIES HAS] THE AUTHORITY TO REGULATE DOMESTIC FERRETS, BUT CURRENTLY DOES NOT DO SO. ALL OTHER SPECIES WITHIN THE FAMILY MUSTELIDAE ARE REGULATED. "HUNTING WITH FERRETS IS PROHIBITED SINCE THIS IS NOT LISTED IN STATE REGULATIONS AS A LEGAL MEANS OF HUNTING. USE AS A PEST CONTROL IS PROHIBITED SINCE EXOTICS CANNOT BE RELEASED INTO THE WILD." (PERS. COMMUN. W/RESPONDENT)

|            |     |    |    |    |    |    |
|------------|-----|----|----|----|----|----|
| WASHINGTON | SAA | NR | NR | NR | NR | NR |
|------------|-----|----|----|----|----|----|

RESPONDER'S COMMENTS: FERRETS ARE CURRENTLY CONSIDERED TO BE DOMESTIC PETS AND ARE THEREFORE UNREGULATED. LOCAL GOVTS COULD REGULATE BUT GENERALLY DO NOT. LEGISLATIVE AUTHORITY COULD BE GRANTED BUT HAS NOT BEEN AN ISSUE.

|               |     |    |     |     |     |     |
|---------------|-----|----|-----|-----|-----|-----|
| WEST VIRGINIA | SAA | PS | SAA | SAA | SAA | SAA |
|---------------|-----|----|-----|-----|-----|-----|

RESPONDER'S COMMENTS: NR

|           |    |    |    |    |    |    |
|-----------|----|----|----|----|----|----|
| WISCONSIN | NR | PS | PS | NR | NR | NR |
|-----------|----|----|----|----|----|----|

RESPONDER'S COMMENTS: FERRETS ARE CURRENTLY NOT REGULATED.

**Appendix B-4**

**PERMITS: WHICH ENTITY HAS AUTHORITY FOR ISSUING PERMITS TO POSSESS DOMESTIC FERRETS FOR THE FOLLOWING ACTIVITIES ?**

|                                                 |                                     |                                       |
|-------------------------------------------------|-------------------------------------|---------------------------------------|
| SWC = state wildlife commission                 | LCG = local government              | OTHER (see COMMENTS for name)         |
| SAA = state agriculture agency                  | FED = federal agencies (i.e., USDA) | NR = no response given (see COMMENTS) |
| SHA = state health agency                       | PS = prohibited statewide           | N/A = not applicable (see COMMENTS)   |
| SWNRA = state wildlife/natural resources agency |                                     |                                       |

**STATE**  
**WYOMING**

|                    |                     |               |                 |
|--------------------|---------------------|---------------|-----------------|
|                    | <b>FARM</b>         | <b>LAB</b>    | <b>BREEDING</b> |
| <b>IMPORTATION</b> | <b>PEST CONTROL</b> | <b>ANIMAL</b> | <b>PET</b>      |
| NR                 | NR                  | NR            | NR              |

RESPONDER'S COMMENTS: NO PERMITS REQUIRED AS FERRETS ARE EXEMPT UNDER CHAPTER 10 COMMISSION REGULATION. "THIS REGULATION ADDRESSES IMPORTATION OF EXOTICS. FERRETS ARE CLASSIFIED AS DOMESTIC." (PERS. COMMUN. W/RESPONDENT)

# HOW FERRETS ARE CLASSIFIED UNDER STATE REGULATIONS & WHAT TERMINOLOGY IS USED

## CLASSIFICATION:

1 = Nongame  
2 = Furbearer  
3 = Wild Animal  
4 = Domestic Animal  
5 = Exotic  
6 = Prohibited, except under permit  
7 = Restricted  
8 = Not Protected  
9 = Other

## NOMENCLATURE:

1 = European polecat  
2 = polecat  
3 = English ferret  
4 = domestic ferret  
5 = ferret  
6 = fitch  
7 = polecat/ferret hybrid  
8 = European ferret  
9 = fitch ferret / European fitch ferret  
10 = *Mustela putorius furo*

| <u>STATE</u>  | <u>CLASSIFICATION</u> | <u>NOMENCLATURE</u> |
|---------------|-----------------------|---------------------|
| ALABAMA       | 4,5                   | NR                  |
| ALASKA        | 5                     | 4,8                 |
| ARIZONA       | 4                     | 4,9                 |
| ARKANSAS      | 4,5                   | NR                  |
| CALIFORNIA    | 3,6,7                 | 2,5                 |
| COLORADO      | 4                     | 4                   |
| CONNECTICUT   | 4                     | 5                   |
| DELAWARE      | 4,5                   | 5                   |
| FLORIDA       | 4,5                   | 4,5,8               |
| GEORGIA       | 3                     | 5,8                 |
| HAWAII        | 7                     | 5                   |
| IDAHO         | 4                     | NONE                |
| ILLINOIS      | 5,6                   | 5                   |
| INDIANA       | 5                     | NONE                |
| IOWA          | 5                     | 5                   |
| KANSAS        | 4                     | 5                   |
| KENTUCKY      | 6                     | 5                   |
| LOUISIANA     | 5                     | NR                  |
| MAINE         | 4                     | N/A                 |
| MARYLAND      | 4                     | 8                   |
| MASSACHUSETTS | N/A                   | 4                   |
| MICHIGAN      | 4                     | 4,5,6               |
| MINNESOTA     | NONE                  | 5                   |
| MISSISSIPPI   | 5                     | 5                   |
| MISSOURI      | N/A                   | N/A                 |
| MONTANA       | N/A                   | N/A                 |

## Appendix B-5

# HOW FERRETS ARE CLASSIFIED UNDER STATE REGULATIONS & WHAT TERMINOLOGY IS USED

## CLASSIFICATION:

1 = Nongame  
2 = Furbearer  
3 = Wild Animal  
4 = Domestic Animal  
5 = Exotic  
6 = Prohibited, except under permit  
7 = Restricted  
8 = Not Protected  
9 = Other

## NOMENCLATURE:

1 = European polecat  
2 = polecat  
3 = English ferret  
4 = domestic ferret  
5 = ferret  
6 = fitch  
7 = polecat/ferret hybrid  
8 = European ferret  
9 = fitch ferret / European fitch ferret  
10 = *Mustela putorius furo*

| <u>STATE</u>   | <u>CLASSIFICATION</u> | <u>NOMENCLATURE</u> |
|----------------|-----------------------|---------------------|
| NEBRASKA       | 4,5                   | 5                   |
| NEVADA         | 8                     | 8                   |
| NEW HAMPSHIRE  | 4                     | UNK                 |
| NEW JERSEY     | 1,5,6                 | 5                   |
| NEW MEXICO     | 1,8                   | NONE                |
| NEW YORK       | 6                     | 5,6,9               |
| NORTH CAROLINA | 5                     | NONE                |
| NORTH DAKOTA   | 4                     | 4                   |
| OHIO           | 5                     | 5                   |
| OKLAHOMA       | 4                     | NONE                |
| OREGON         | 4                     | 5                   |
| PENNSYLVANIA   | 4                     | N/A                 |
| RHODE ISLAND   | 2                     | 8                   |
| SOUTH CAROLINA | 5                     | 4,5,8               |
| SOUTH DAKOTA   | 4                     | NR                  |
| TENNESSEE      | 9                     | 5                   |
| TEXAS          | 4                     | 4                   |
| UTAH           | 4                     | NR                  |
| VERMONT        | 4                     | 1                   |
| VIRGINIA       | 5                     | 10                  |
| WASHINGTON     | 4                     | NONE                |
| WEST VIRGINIA  | 4                     | 5                   |
| WISCONSIN      | N/A                   | 6                   |
| WYOMING        | 4                     | 4                   |

## Appendix B-5



# ESTIMATED NUMBER OF LEGALLY POSSESSED FERRETS

| <u>STATE</u>                                                                                                                                                                                                                                                                                                                                                            | <u>TOTAL</u> | <u>PETS</u> | <u>BREEDING STOCK</u> | <u>LAB ANIMALS</u> | <u>HUNTING FERRETS</u> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|-----------------------|--------------------|------------------------|
| ALABAMA                                                                                                                                                                                                                                                                                                                                                                 | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NOT UNCOMMON                                                                                                                                                                                                                                                                                                                                      |              |             |                       |                    |                        |
| ALASKA                                                                                                                                                                                                                                                                                                                                                                  | 300          | 300         | UNK                   | UNK                | 0                      |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                |              |             |                       |                    |                        |
| ARIZONA                                                                                                                                                                                                                                                                                                                                                                 | **10,000     | **9,500     | **500                 | UNK                | 0                      |
| RESPONDER'S COMMENTS: ***THESE ARE ESTIMATED NUMBERS. INFORMATION ON ACTUAL NUMBERS IS NOT AVAILABLE SINCE FERRETS ARE NOT REGULATED." (PERS. COMMUN. W/ RESPONDENT)                                                                                                                                                                                                    |              |             |                       |                    |                        |
| ARKANSAS                                                                                                                                                                                                                                                                                                                                                                | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                |              |             |                       |                    |                        |
| CALIFORNIA                                                                                                                                                                                                                                                                                                                                                              | <500         | 0           | 0                     | <500               | 0                      |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                |              |             |                       |                    |                        |
| COLORADO                                                                                                                                                                                                                                                                                                                                                                | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                |              |             |                       |                    |                        |
| CONNECTICUT                                                                                                                                                                                                                                                                                                                                                             | UNK          | NR          | NR                    | NR                 | **                     |
| RESPONDER'S COMMENTS: **HUNTING IS PROHIBITED                                                                                                                                                                                                                                                                                                                           |              |             |                       |                    |                        |
| DELAWARE                                                                                                                                                                                                                                                                                                                                                                | UNK          | NR          | NR                    | NR                 | 0                      |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                |              |             |                       |                    |                        |
| FLORIDA                                                                                                                                                                                                                                                                                                                                                                 | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                |              |             |                       |                    |                        |
| GEORGIA                                                                                                                                                                                                                                                                                                                                                                 | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                |              |             |                       |                    |                        |
| HAWAII                                                                                                                                                                                                                                                                                                                                                                  | 0            | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                |              |             |                       |                    |                        |
| IDAHO                                                                                                                                                                                                                                                                                                                                                                   | NR           | UNK         | UNK                   | UNK                | UNK                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                |              |             |                       |                    |                        |
| ILLINOIS                                                                                                                                                                                                                                                                                                                                                                | NR           | **671       | UNK                   | UNK                | **0                    |
| RESPONDER'S COMMENTS: **AGENCY ISSUED 671 "FREE" FERRET PERMITS IN 1996. HOWEVER, IT'S LIKELY THAT MORE THAN THIS NUMBER OF FERRETS ARE BEING HELD AS PETS BECAUSE THE REGULATION IS LITTLE KNOWN AND POORLY ENFORCED. LAB = UNKNOWN, PROBABLY LESS THAN 100; **HUNTING = PROBABLY 0; BREEDING STOCK = UNKNOWN, THIS USUALLY OCCURS IN PET STORES WITH CLASS B PERMITS. |              |             |                       |                    |                        |
| INDIANA                                                                                                                                                                                                                                                                                                                                                                 | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                                                |              |             |                       |                    |                        |

## Appendix B-6

# ESTIMATED NUMBER OF LEGALLY POSSESSED FERRETS

| <u>STATE</u>                                                                                                                                                                                                                                                                                                                        | <u>TOTAL</u> | <u>PETS</u> | <u>BREEDING STOCK</u> | <u>LAB ANIMALS</u> | <u>HUNTING FERRETS</u> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|-----------------------|--------------------|------------------------|
| IOWA                                                                                                                                                                                                                                                                                                                                | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NO ESTIMATE AVAILABLE                                                                                                                                                                                                                                                                                         |              |             |                       |                    |                        |
| KANSAS                                                                                                                                                                                                                                                                                                                              | NR           | UNK         | UNK                   | UNK                | UNK                    |
| RESPONDER'S COMMENTS: NOT REGULATED, ESTIMATES HAVE NOT BEEN DONE                                                                                                                                                                                                                                                                   |              |             |                       |                    |                        |
| KENTUCKY                                                                                                                                                                                                                                                                                                                            | 150          | **35        | **25                  | 0                  | 0                      |
| RESPONDER'S COMMENTS: **PETS = 35 PERMITS, MOST PROBABLY KEEP THEM ILLEGALLY; **BREEDING STOCK = 25 PERMITS, MAY HAVE SEVERAL FERRETS, BUT HAVE COMMERCIAL PROPAGATION PERMITS, AND MANY ARE PET STORES                                                                                                                             |              |             |                       |                    |                        |
| LOUISIANA                                                                                                                                                                                                                                                                                                                           | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                            |              |             |                       |                    |                        |
| MAINE                                                                                                                                                                                                                                                                                                                               | N/A          | N/A         | N/A                   | N/A                | N/A                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                            |              |             |                       |                    |                        |
| MARYLAND                                                                                                                                                                                                                                                                                                                            | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                            |              |             |                       |                    |                        |
| MASSACHUSETTS                                                                                                                                                                                                                                                                                                                       | ~ 2000       | ~ 2000      | 0                     | 100-200            | 0                      |
| RESPONDER'S COMMENTS: SOME PEOPLE HAVE SUGGESTED AS MANY AS 10,000. THIS IS NOT TRACKED SINCE NO PERMIT IS REQUIRED. BREEDING STOCK = FOUR APPLICANTS ARE AWAITING PERMITS WHICH WILL BE \$1,000 PER YEAR. THE FEE HAS NOT YET BEEN FORMALLY SET SO NO PERMITS CAN BE ISSUED. THE STATUTE PROVIDES THAT IT BE NO LESS THAN \$1,000. |              |             |                       |                    |                        |
| MICHIGAN                                                                                                                                                                                                                                                                                                                            | NR           | NR          | NR                    | NR                 | 0                      |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                            |              |             |                       |                    |                        |
| MINNESOTA                                                                                                                                                                                                                                                                                                                           | UNK          | UNK         | UNK                   | UNK                | 0                      |
| RESPONDER'S COMMENTS: NO ESTIMATE OF ESTIMATED NUMBER OF LEGALLY POSSESSED FERRETS.                                                                                                                                                                                                                                                 |              |             |                       |                    |                        |
| MISSISSIPPI                                                                                                                                                                                                                                                                                                                         | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                            |              |             |                       |                    |                        |
| MISSOURI                                                                                                                                                                                                                                                                                                                            | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                            |              |             |                       |                    |                        |
| MONTANA                                                                                                                                                                                                                                                                                                                             | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                            |              |             |                       |                    |                        |
| NEBRASKA                                                                                                                                                                                                                                                                                                                            | UNK          | UNK         | UNK                   | UNK                | UNK                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                            |              |             |                       |                    |                        |
| NEVADA                                                                                                                                                                                                                                                                                                                              | NR           | UNK         | UNK                   | UNK                | UNK                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                            |              |             |                       |                    |                        |

## Appendix B-6

# ESTIMATED NUMBER OF LEGALLY POSSESSED FERRETS

| <u>STATE</u>                                                                                                                                                                                                                                                                                                                  | <u>TOTAL</u> | <u>PETS</u> | <u>BREEDING STOCK</u> | <u>LAB ANIMALS</u> | <u>HUNTING FERRETS</u> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|-----------------------|--------------------|------------------------|
| NEW HAMPSHIRE                                                                                                                                                                                                                                                                                                                 | NR           | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                      |              |             |                       |                    |                        |
| NEW JERSEY                                                                                                                                                                                                                                                                                                                    | NR           | **20,000    | UNK                   | 2000               | 0                      |
| RESPONDER'S COMMENTS: ***THESE NUMBERS WERE ESTIMATES BASED ON THE # OF PERMITS ISSUED AND HOW MANY FERRETS ARE REPORTED BY PET STORES AS BEING SOLD (& WHOLESALERS)." (PERS. COMMUN. W/RESPONDENT)                                                                                                                           |              |             |                       |                    |                        |
| NEW MEXICO                                                                                                                                                                                                                                                                                                                    | NR           | UNK         | NR                    | NR                 | 0                      |
| RESPONDER'S COMMENTS: FERRETS ARE COMMONLY SOLD BY MOST PET STORES AND WE HAVE NO WAY TO ESTIMATE NUMBERS.                                                                                                                                                                                                                    |              |             |                       |                    |                        |
| NEW YORK                                                                                                                                                                                                                                                                                                                      | **6000       | NR          | NR                    | **                 | **                     |
| RESPONDER'S COMMENTS: **PETS AND BREEDING STOCK COMBINED = 6,000. "THIS IS THE NUMBER OF FERRET LICENSES ISSUED IN 1996. FERRET BREEDERS, PET STORES, AND INDIVIDUAL OWNERS APPLY FOR THE SAME LICENSE. THUS, THE NUMBER OF LICENSES DOES NOT REPRESENT THE ACTUAL NUMBER OF FERRETS POSSESSED." (PERS. COMMUN. W/RESPONDENT) |              |             |                       |                    |                        |
| NORTH CAROLINA                                                                                                                                                                                                                                                                                                                | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                      |              |             |                       |                    |                        |
| NORTH DAKOTA                                                                                                                                                                                                                                                                                                                  | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: DON'T HAVE A FIGURE                                                                                                                                                                                                                                                                                     |              |             |                       |                    |                        |
| OHIO                                                                                                                                                                                                                                                                                                                          | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NOT MONITORED BY DOW                                                                                                                                                                                                                                                                                    |              |             |                       |                    |                        |
| OKLAHOMA                                                                                                                                                                                                                                                                                                                      | NR           | N/A         | N/A                   | N/A                | 0                      |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                      |              |             |                       |                    |                        |
| OREGON                                                                                                                                                                                                                                                                                                                        | NR           | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                      |              |             |                       |                    |                        |
| PENNSYLVANIA                                                                                                                                                                                                                                                                                                                  | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NO WAY TO TELL                                                                                                                                                                                                                                                                                          |              |             |                       |                    |                        |
| RHODE ISLAND                                                                                                                                                                                                                                                                                                                  | THOUSAND     | THOUSAND    | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: PETS = SEVERAL THOUSANDS                                                                                                                                                                                                                                                                                |              |             |                       |                    |                        |
| SOUTH CAROLINA                                                                                                                                                                                                                                                                                                                | NR           | UNK         | UNK                   | UNK                | 0                      |
| RESPONDER'S COMMENTS: NUMBER OF PETS IS INCREASING                                                                                                                                                                                                                                                                            |              |             |                       |                    |                        |
| SOUTH DAKOTA                                                                                                                                                                                                                                                                                                                  | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                      |              |             |                       |                    |                        |
| TENNESSEE                                                                                                                                                                                                                                                                                                                     | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NO RECORDS HAVE BEEN KEPT                                                                                                                                                                                                                                                                               |              |             |                       |                    |                        |

## Appendix B-6

# ESTIMATED NUMBER OF LEGALLY POSSESSED FERRETS

| <u>STATE</u>                      | <u>TOTAL</u> | <u>PETS</u> | <u>BREEDING STOCK</u> | <u>LAB ANIMALS</u> | <u>HUNTING FERRETS</u> |
|-----------------------------------|--------------|-------------|-----------------------|--------------------|------------------------|
| TEXAS                             | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR          |              |             |                       |                    |                        |
| UTAH                              | NR           | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR          |              |             |                       |                    |                        |
| VERMONT                           | N/A          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR          |              |             |                       |                    |                        |
| VIRGINIA                          | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NO ESTIMATE |              |             |                       |                    |                        |
| WASHINGTON                        | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR          |              |             |                       |                    |                        |
| WEST VIRGINIA                     | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR          |              |             |                       |                    |                        |
| WISCONSIN                         | UNK          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR          |              |             |                       |                    |                        |
| WYOMING                           | N/A          | NR          | NR                    | NR                 | NR                     |
| RESPONDER'S COMMENTS: NR          |              |             |                       |                    |                        |

CASES OF STRAYS: N = NONE S = SPORADIC F = FREQUENT NR = NO RESPONSE  
R = RARE C = COMMON UNK = UNKNOWN

ANSWERS: DO YOU HAVE EVIDENCE OF THE FOLLOWING?

| STATE       | CASES OF STRAYS<br>IN URBAN AREAS |  | INDIVIDUALS<br>SURVIVING IN WILD |  | BREEDING<br>SUSPECTED NOW |  | BREEDING<br>SUSPECTED IN PAST |  | BREEDING INDIVIDUALS<br>DOCUMENTED NOW |  | BREEDING INDIVIDUALS<br>DOCUMENTED IN PAST |  |
|-------------|-----------------------------------|--|----------------------------------|--|---------------------------|--|-------------------------------|--|----------------------------------------|--|--------------------------------------------|--|
|             | R                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| ALABAMA     |                                   |  |                                  |  |                           |  |                               |  |                                        |  |                                            |  |
| ALASKA      | S                                 |  | Y                                |  | N                         |  | Y                             |  | N                                      |  | N                                          |  |
| ARIZONA     | S                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| ARKANSAS    | N                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| CALIFORNIA  | S                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| COLORADO    | R                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| CONNECTICUT | N                                 |  | Y                                |  | N                         |  | NR                            |  | N                                      |  | N                                          |  |
| DELAWARE    | R                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| FLORIDA     | S                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| GEORGIA     | F                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| HAWAII      | N                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| IDAHO       | N                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| ILLINOIS    | R                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| INDIANA     | N                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| IOWA        | R                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| KANSAS      | UNK                               |  | UNK                              |  | UNK                       |  | UNK                           |  | UNK                                    |  | UNK                                        |  |
| KENTUCKY    | N                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| LOUISIANA   | NR                                |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| MAINE       | UNK                               |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |
| MARYLAND    | S                                 |  | N                                |  | N                         |  | N                             |  | N                                      |  | N                                          |  |

## Appendix B-7

CASES OF STRAYS: N = NONE S = SPORADIC F = FREQUENT NR = NO RESPONSE  
R = RARE C = COMMON UNK = UNKNOWN

ANSWERS: DO YOU HAVE EVIDENCE OF THE FOLLOWING?

| STATE          | CASES OF STRAYS<br>IN URBAN AREAS | INDIVIDUALS<br>SURVIVING IN WILD | BREEDING<br>SUSPECTED NOW | BREEDING<br>SUSPECTED IN PAST | BREEDING INDIVIDUALS<br>DOCUMENTED NOW | BREEDING INDIVIDUALS<br>DOCUMENTED IN PAST |
|----------------|-----------------------------------|----------------------------------|---------------------------|-------------------------------|----------------------------------------|--------------------------------------------|
| MASSACHUSETTS  | S                                 | Y                                | N                         | N                             | N                                      | N                                          |
| MICHIGAN       | R                                 | N                                | N                         | N                             | N                                      | N                                          |
| MINNESOTA      | N                                 | N                                | N                         | N                             | N                                      | N                                          |
| MISSISSIPPI    | R                                 | N                                | N                         | N                             | N                                      | N                                          |
| MISSOURI       | N                                 | N                                | N                         | N                             | N                                      | N                                          |
| MONTANA        | UNK                               | UNK                              | N                         | N                             | N                                      | N                                          |
| NEBRASKA       | S                                 | N                                | N                         | N                             | N                                      | N                                          |
| NEVADA         | R                                 | N                                | N                         | N                             | N                                      | N                                          |
| NEW HAMPSHIRE  | R                                 | N                                | N                         | N                             | N                                      | N                                          |
| NEW JERSEY     | S                                 | N                                | N                         | N                             | N                                      | N                                          |
| NEW MEXICO     | C                                 | N                                | N                         | Y                             | N                                      | N                                          |
| NEW YORK       | S                                 | N                                | N                         | N                             | N                                      | N                                          |
| NORTH CAROLINA | N                                 | N                                | N                         | N                             | N                                      | N                                          |
| NORTH DAKOTA   | R                                 | N                                | N                         | N                             | N                                      | N                                          |
| OHIO           | S                                 | N                                | N                         | N                             | N                                      | N                                          |
| OKLAHOMA       | N                                 | N                                | N                         | N                             | N                                      | N                                          |
| OREGON         | NR                                | N                                | N                         | N                             | N                                      | N                                          |
| PENNSYLVANIA   | R                                 | N                                | N                         | N                             | N                                      | N                                          |
| RHODE ISLAND   | R                                 | UNK                              | N                         | N                             | N                                      | N                                          |

## Appendix B-7



CASES OF STRAYS: N = NONE S = SPORADIC F = FREQUENT NR = NO RESPONSE  
R = RARE C = COMMON UNK = UNKNOWN

ANSWERS: DO YOU HAVE EVIDENCE OF THE FOLLOWING?

| STATE          | CASES OF STRAYS<br>IN URBAN AREAS |   | INDIVIDUALS<br>SURVIVING IN WILD |     | BREEDING<br>SUSPECTED NOW |     | BREEDING<br>SUSPECTED IN PAST |     | BREEDING INDIVIDUALS<br>DOCUMENTED NOW |     | BREEDING INDIVIDUALS<br>DOCUMENTED IN PAST |     |
|----------------|-----------------------------------|---|----------------------------------|-----|---------------------------|-----|-------------------------------|-----|----------------------------------------|-----|--------------------------------------------|-----|
|                | R                                 | S | N                                | UNK | N                         | UNK | N                             | UNK | N                                      | UNK | N                                          | UNK |
| SOUTH CAROLINA |                                   |   |                                  |     |                           |     |                               |     |                                        |     |                                            |     |
| SOUTH DAKOTA   | S                                 |   | N                                |     | N                         |     | N                             |     | N                                      |     | N                                          |     |
| TENNESSEE      | N                                 |   | N                                |     | N                         |     | N                             |     | N                                      |     | N                                          |     |
| TEXAS          | R                                 |   | N                                |     | N                         |     | N                             |     | N                                      |     | N                                          |     |
| UTAH           | N                                 |   | N                                |     | N                         |     | N                             |     | N                                      |     | N                                          |     |
| VERMONT        | R                                 |   | N                                |     | N                         |     | N                             |     | N                                      |     | N                                          |     |
| VIRGINIA       | N                                 |   | N                                |     | N                         |     | N                             |     | N                                      |     | N                                          |     |
| WASHINGTON     | R                                 |   | Y                                |     | N                         |     | Y                             |     | N                                      |     | N                                          |     |
| WEST VIRGINIA  | N                                 |   | N                                |     | N                         |     | N                             |     | N                                      |     | N                                          |     |
| WISCONSIN      | N                                 |   | N                                |     | N                         |     | N                             |     | N                                      |     | N                                          |     |
| WYOMING        | S                                 |   | Y                                |     | N                         |     | N                             |     | N                                      |     | N                                          |     |

## Appendix B-7

## VARIABLE DESCRIPTIONS FOR APPENDIX B-8

### "ESTABLISHED BREEDING POPLT"

Answers: An established breeding population of domestic ferrets in your state:

- 1 = definitely exists
- 2 = probably exists
- 3 = has been reported, but not confirmed as existing
- 4 = definitely does not exist
- 5 = probably does not exist
- 6 = would not likely exist
- 7 = definitely existed but definitely no longer exists
- 8 = definitely existed but current status is unknown
- 9 = cannot be determined without special survey
- 10 = would not be a serious concern
- 11 = unknown

### "EFFORT TO ASSESS STATUS"

Answers: The amount of effort the state wildlife agency has made to assess the status of ferrets in the wild.

- 1 = little effort
- 2 = moderate effort
- 3 = intense effort
- 4 = none, desirable but not feasible
- 5 = none, not considered to be important
- 6 = none

### "HOW IS EFFORT MADE"

Answers: Effort made to assess the status of ferrets in the wild.

- 1 = opportunistically document
- 2 = thoroughly check out all reports
- 3 = routinely check during area studies
- 4 = special sampling
- 5 = concerted surveys

### "CONTROL FOR INDV"

Answers: Control action taken by staff if an individual domestic ferret were discovered on state wildlife lands.

- 1 = live trap and take to shelter (presumed lost pet)
- 2 = live trap and euthanasia
- 3 = lethal traps
- 4 = take by any means
- 5 = local area management decision
- 6 = no action would be taken

### "CONTROL FOR POPLT"

Answers: Action taken by state agencies upon discovery of an established breeding population of ferrets.

- 1 = attempt eradication
- 2 = capture & turn over to local ferret groups for neutering & placement
- 3 = local area management decision
- 4 = no action would be taken
- 5 = unknown/undecided/determine extent and then act

ANSWERS: STATUS OF FERRETS IN THE WILD, CONTROL ACTION TO BE TAKEN UPON DISCOVERY OF AN INDIVIDUAL FERRET OR BREEDING POPULATION, AND ANY ENVIRONMENTAL CONCERNS.

| STATE       | ESTABLISHED    |              | EFFORT TO    |              | HOW IS      |             | CONTROL  |           | ENVIRONMENTAL CONCERNS LISTED BY RESPONDER                                                                                                                                                                                                                                                                                            |
|-------------|----------------|--------------|--------------|--------------|-------------|-------------|----------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | BREEDING POPLT | ASSES STATUS | ASSES STATUS | ASSES STATUS | EFFORT MADE | EFFORT MADE | FOR INDV | FOR POPLT |                                                                                                                                                                                                                                                                                                                                       |
| ALABAMA     | 5              | 5            | 5            | 5            | NR          | NR          | 5        | 5         | NR                                                                                                                                                                                                                                                                                                                                    |
| ALASKA      | 3,9            | 4            | 4            | 4            | 1           | 1           | 2,3,5    | 1,3       | CONCERN THAT A WILD (FERAL) POPULATION COULD BE DETRIMENTAL TO INDIGENOUS PREY POPULATIONS, DISPLACE INDIGENOUS MUSTELIDS OR OTHER ANIMALS, AND INTRODUCE OR SPREAD DISEASE. HOWEVER, IN MOST PARTS OF THE STATE, FERRETS PROBABLY COULD NOT SURVIVE THROUGH THE WINTER.                                                              |
| ARIZONA     | 3              | 3            | 3            | 3            | 5           | 5           | 1        | 1         | ARIZONA RECENTLY INITIATED A REINTRODUCTION PROGRAM FOR BLACK-FOOTED FERRETS (BFF) (Mustela nigripes). THE ESTABLISHMENT OR RELEASE OF "PET" FERRETS WITHIN THE EXPECTED RANGE OF BFFs IS A CONCERN.                                                                                                                                  |
| ARKANSAS    | 5              | 5            | 5            | 5            | NR          | NR          | 1        | 5         | NR                                                                                                                                                                                                                                                                                                                                    |
| CALIFORNIA  | 9              | 4            | 4            | 4            | 1           | 1           | 1,5      | 1         | ESCAPED OR RELEASED FERRETS MIGHT SURVIVE ON NATIVE WILDLIFE, CAUSING LOCAL WILDLIFE DAMAGE AND NECESSITATING CONTROL ACTIVITIES. IN SOME LOCATIONS, LOCAL BREEDING POPULATIONS COULD BECOME ESTABLISHED, CAUSING SERIOUS ENVIRONMENTAL DAMAGE. POTENTIAL PRESENCE IN WILD WOULD NECESSITATE ASSESSMENT OF REPORTS AT AGENCY EXPENSE. |
| COLORADO    | 5              | 1            | 1            | 1            | 1           | 1           | 1        | 1         | WE HAVE POLICIES IN PLACE THAT WOULD ALLOW US TO DEAL WITH THEM AS AN "EXOTIC" ON PUBLIC LAND AND WITH FEDERAL GOV AGENCY COOPERATION. WOULD PROBABLY HAVE A HARD TIME MAKING IT HERE.                                                                                                                                                |
| CONNECTICUT | 5              | 5            | 5            | 5            | N/A         | N/A         | 1,5      | 1,3       | NONE                                                                                                                                                                                                                                                                                                                                  |
| DELAWARE    | 5              | 5            | 5            | 5            | NR          | NR          | 4        | 1         | NR                                                                                                                                                                                                                                                                                                                                    |
| FLORIDA     | 5              | 4            | 4            | 4            | 1           | 1           | 5        | 3         | NR                                                                                                                                                                                                                                                                                                                                    |
| GEORGIA     | 4              | 5            | 5            | 5            | NR          | NR          | 2        | 1         | NR                                                                                                                                                                                                                                                                                                                                    |
| HAWAII      | 4              | 5            | 5            | 5            | 1           | 1           | 5        | 1         | SIMILAR TO MONGOOSE. PEST SPECIES THAT WILL PREY ON ENDANGERED SPECIES, I.E. BIRDS, REPTILES.                                                                                                                                                                                                                                         |

## Appendix B-8

**ANSWERS: STATUS OF FERRETS IN THE WILD, CONTROL ACTION TO BE TAKEN UPON DISCOVERY OF AN INDIVIDUAL FERRET  
OR BREEDING POPULATION, AND ANY ENVIRONMENTAL CONCERNS.**

| <u>STATE</u>  | <u>ESTABLISHED<br/>BREEDING POPLT</u> | <u>EFFORT TO<br/>ASSESS STATUS</u> | <u>HOW IS<br/>EFFORT MADE</u> | <u>CONTROL<br/>FOR INDY</u> | <u>CONTROL<br/>FOR POPLT</u> | <u>ENVIRONMENTAL CONCERNS LISTED BY RESPONDER</u>                                                                                                                                                                                                                |
|---------------|---------------------------------------|------------------------------------|-------------------------------|-----------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IDAHO         | 9                                     | 5                                  | NR                            | 1                           | 1                            | NR                                                                                                                                                                                                                                                               |
| ILLINOIS      | 5                                     | 5                                  | 1                             | 5                           | 5                            | AT THE PRESENT TIME, FERRETS ARE NOT OF CONCERN.<br>IF FERAL, REPRODUCING POPULATION (S) OF FERRETS<br>WAS DOCUMENTED, AGENCY WOULD LIKELY TAKE ACTION<br>TO PROHIBIT THEIR IMPORTATION, POSSESSION,<br>RELEASE, ETC. HOWEVER, LEGISLATION WOULD BE<br>REQUIRED. |
| INDIANA       | 11                                    | 5                                  | N/A                           | 5                           | 3                            | NR                                                                                                                                                                                                                                                               |
| IOWA          | 4                                     | 5                                  | NR                            | 4                           | 5                            | THIS IS A COMPLETE NON ISSUE FOR IOWA. NO<br>CONCERNS HAVE BEEN EXPRESSED OR IDENTIFIED BY<br>AGENCY OR PUBLIC.                                                                                                                                                  |
| KANSAS        | 11                                    | 6                                  | NR                            | 6                           | 4                            | NR                                                                                                                                                                                                                                                               |
| KENTUCKY      | 5                                     | 5                                  | 1                             | 4                           | 1                            | THIS IS A GREAT UNKNOWN IN THIS STATE,<br>FURTHERMORE, WE HAVE NOT REALLY ADDRESSED THE<br>ISSUE, EXCEPT FOR REQUIRING OWNERS TO HAVE<br>PERMITS. FERAL POPULATIONS ARE A CONCERN, AS IS<br>DISEASE, BUT SADLY, WE HAVE NOT ADDRESSED THE<br>ISSUE.              |
| LOUISIANA     | 5                                     | 5                                  | NR                            | 5                           | 1                            | NR                                                                                                                                                                                                                                                               |
| MAINE         | 5                                     | 5                                  | NR                            | 6                           | 1                            | NONE - THEY WOULD HAVE STIFF COMPETITION FROM<br>MARTEN, MINK, AND FISHER IN THE STATE.                                                                                                                                                                          |
| MARYLAND      | 4                                     | 5                                  | NR                            | 5                           | 1                            | NR                                                                                                                                                                                                                                                               |
| MASSACHUSETTS | 4                                     | 6                                  | 1                             | 1,2,4                       | 1                            | THERE HAVE BEEN MANY ESCAPES IN MASSACHUSETTS<br>OVER THE PAST 200 YEARS WITH NO INDICATION THAT<br>LONG-TERM SURVIVAL OF INDIVIDUALS, MUCH LESS THE<br>ESTABLISHMENT OF A POPULATION, IS A RISK.                                                                |
| MICHIGAN      | 5                                     | 1                                  | 1                             | 1                           | 5                            | NR                                                                                                                                                                                                                                                               |
| MINNESOTA     | 4                                     | 5                                  | NR                            | 5                           | 1                            | NR                                                                                                                                                                                                                                                               |
| MISSISSIPPI   | 5.9                                   | 5                                  | NR                            | 1                           | 4                            | NR                                                                                                                                                                                                                                                               |

**Appendix B-8**

**ANSWERS: STATUS OF FERRETS IN THE WILD, CONTROL ACTION TO BE TAKEN UPON DISCOVERY OF AN INDIVIDUAL FERRET  
OR BREEDING POPULATION, AND ANY ENVIRONMENTAL CONCERNS.**

| STATE          | ESTABLISHED<br>BREEDING POPLT | EFFORT TO<br>ASSESS STATUS | HOW IS<br>EFFORT MADE | CONTROL<br>FOR INDV | CONTROL<br>FOR POPLT | ENVIRONMENTAL CONCERNS LISTED BY RESPONDER                                                                                                                                                                               |
|----------------|-------------------------------|----------------------------|-----------------------|---------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |                               |                            |                       |                     |                      | NR                                                                                                                                                                                                                       |
| MISSOURI       | 5                             | 5                          | NR                    | 5                   | 1                    | NR                                                                                                                                                                                                                       |
| MONTANA        | 5                             | 5                          | N/A                   | 4                   | 1                    | DISEASE - ESPECIALLY IN LIGHT OF REINTRODUCTION OF<br>BLACK-FOOTED FERRETS                                                                                                                                               |
| NEBRASKA       | 5,9                           | 5                          | NR                    | 5                   | 1                    | FERRETS ARE OF NO PARTICULAR CONCERN, BUT WE ARE<br>GENERALLY CONCERNED W/ INTRODUCTION OF EXOTICS<br>TO WILD AND ARE TAKING STEPS TO REGULATE THE<br>ARENA.                                                             |
| NEVADA         | 6                             | 1                          | 1                     | 4                   | 1                    | NR                                                                                                                                                                                                                       |
| NEW HAMPSHIRE  | 4                             | 5                          | NR                    | 5,6                 | 5                    | NR                                                                                                                                                                                                                       |
| NEW JERSEY     | 5                             | 4                          | 1                     | 1                   | 1                    | DESTRUCTION OF NATIVE GAME AND NONGAME WILDLIFE<br>BY ESCAPED INDIVIDUALS OR ESTABLISHED POPULATIONS<br>(WERE THIS TO HAPPEN)                                                                                            |
| NEW MEXICO     | 6                             | 1                          | 1                     | 4                   | 1                    | ESTABLISHMENT OF POPULATION IS OF CONCERN TO<br>WELL-BEING OF NATIVE SPECIES AND PREY BASES                                                                                                                              |
| NEW YORK       | 6                             | 5                          | NR                    | 6                   | 5                    | POSSIBLE CONCERN OF ESCAPE AND ESTABLISHMENT IN<br>THE WILD. EXPERIENCE INDICATES THIS HAS NOT TAKEN<br>PLACE TO THE BEST OF OUR KNOWLEDGE.                                                                              |
| NORTH CAROLINA | 5,9                           | 5                          | N/A                   | 5                   | 5                    | UNKNOWN                                                                                                                                                                                                                  |
| NORTH DAKOTA   | 5                             | 5                          | NR                    | 4                   | 1                    | NONE AT THIS TIME SINCE FERRETS ARE NOT AN ISSUE,<br>HOWEVER, DOMESTIC ANIMALS IN THE WILD WILL BE<br>ELIMINATED IF THEY BEGIN TO OCCUR                                                                                  |
| OHIO           | 6                             | 5                          | NR                    | 4                   | 3                    | NR                                                                                                                                                                                                                       |
| OKLAHOMA       | 5                             | 5                          | 1                     | 5                   | 3                    | NR                                                                                                                                                                                                                       |
| OREGON         | 9                             | 4                          | NR                    | 4                   | 1                    | FERRETS AND FERRET-LIKE ANIMALS HAVE BEEN<br>CAPTURED FROM THE WILD IN OREGON. WE HAVE<br>CONCERNS WITH POSSIBLE PREDATION, HABITAT<br>OCCUPATION, COMPETITION, AND POSSIBLE DISEASE<br>TRANSMISSION TO NATIVE WILDLIFE. |
| PENNSYLVANIA   | 5                             | 5                          | NR                    | 2                   | 1                    | NR                                                                                                                                                                                                                       |

**Appendix B-8**

**ANSWERS: STATUS OF FERRETS IN THE WILD, CONTROL ACTION TO BE TAKEN UPON DISCOVERY OF AN INDIVIDUAL FERRET  
OR BREEDING POPULATION, AND ANY ENVIRONMENTAL CONCERNS.**

| <u>STATE</u>   | <u>ESTABLISHED<br/>BREEDING POPLT</u> | <u>EFFORT TO<br/>ASSESS STATUS</u> | <u>HOW IS<br/>EFFORT MADE</u> | <u>CONTROL<br/>FOR INDV</u> | <u>CONTROL<br/>FOR POPLT</u> | <u>ENVIRONMENTAL CONCERNS LISTED BY RESPONDER</u>                                                                                                                                                                                                                                             |
|----------------|---------------------------------------|------------------------------------|-------------------------------|-----------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RHODE ISLAND   | 5                                     | 1                                  | 1                             | 1                           | 2                            | LAW WAS ORIGINALLY ENACTED TO PROHIBIT HUNTING WITH FERRETS; LATEST REVISION ALLOWED PETS WITH PERMITS REQUIRING VACCINATIONS AND NEUTERING                                                                                                                                                   |
| SOUTH CAROLINA | 5                                     | 5                                  | NR                            | 4,5                         | 3                            | NONE AT THIS POINT                                                                                                                                                                                                                                                                            |
| SOUTH DAKOTA   | 5                                     | 4                                  | NR                            | 4                           | 1                            | ALTHOUGH WE HAVE HAD CONCERNS IN THE PAST, THE CHANCES OF A DOMESTIC FERRET SURVIVING IN THE WILD ARE REMOTE AT BEST. PEN RAISED, WILD BLACK-FOOTED FERRETS HAVE AN EXTREMELY HIGH NATURAL MORTALITY WHEN RELEASED IN THE WILD UNDER BEST OF CONDITIONS.                                      |
| TENNESSEE      | 5                                     | 5                                  | NR                            | 1                           | 5                            | NR                                                                                                                                                                                                                                                                                            |
| TEXAS          | 11                                    | 6                                  | NR                            | 1,4,5                       | 3,5                          | TPWD RECEIVES PERIODIC INQUIRIES FROM FERRET OWNERS ENTERING TEXAS FROM OTHER STATES (PARTICULARLY CA). TEXAS MAY SEE AN INCREASE IN FERRET PET TRADE DUE TO LACK OF REGULATIONS. THE POSSIBILITY OF ESCAPED FERRETS SURVIVING IN THE WILD, ALTHOUGH LOW, HAS ONLY RECENTLY BECOME A CONCERN. |
| UTAH           | 6                                     | 5                                  | NR                            | 1                           | 5                            | NR                                                                                                                                                                                                                                                                                            |
| VERMONT        | 4                                     | 5                                  | 1                             | 4                           | 1                            | NR                                                                                                                                                                                                                                                                                            |
| VIRGINIA       | 4                                     | 5                                  | NR                            | 2                           | 1                            | ANY SPECIES THAT MAY DIRECTLY OR INDIRECTLY IMPACT NATIVE WILDLIFE IS A CONCERN.                                                                                                                                                                                                              |
| WASHINGTON     | 5                                     | 5                                  | NR                            | 1                           | 3                            | NR                                                                                                                                                                                                                                                                                            |
| WEST VIRGINIA  | 4                                     | 5                                  | NR                            | 4                           | 1                            | NR                                                                                                                                                                                                                                                                                            |
| WISCONSIN      | 5                                     | 5                                  | NR                            | 5                           | 1                            | NR                                                                                                                                                                                                                                                                                            |
| WYOMING        | 5                                     | 2                                  | 1,2,4,5                       | 1,2,4                       | 5                            | "NONE PRESENTLY" (PERS. COMMUN. W/RESPONDENT)                                                                                                                                                                                                                                                 |

**Appendix B-8**



# FACILITIES WHICH HANDLE LOST OR ABANDONED FERRETS

PFS = private ferret shelters  
HSS = humane society shelters  
WRC = wildlife rehabilitation centers  
ACC = animal control centers

SWA = state wildlife agency facilities  
SAA = state agriculture agency facilities  
SHA = state health agency facilities

| STATE       | PFS | PERMIT? | HSS | PERMIT? | WRC | PERMIT? | SWA | SAA | SHA | ACC | PERMIT? | OTHER | PERMIT? | NONE | UNKNOWN |
|-------------|-----|---------|-----|---------|-----|---------|-----|-----|-----|-----|---------|-------|---------|------|---------|
| ALABAMA     | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| ALASKA      | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| ARIZONA     | Y   | N       | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| ARKANSAS    | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| CALIFORNIA  | NR  | NR      | NR  | NR      | NR  | NR      | Y   | NR  | NR  | NR  | NR      | Y     | Y       | NR   | NR      |
| COLORADO    | Y   | N       | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| CONNECTICUT | Y   | N       | Y   | N       | Y   | Y       | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| DELAWARE    | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| FLORIDA     | Y   | N       | NR  | NR      | Y   | N       | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| GEORGIA     | Y   | N       | Y   | N       | Y   | N       | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| HAWAII      | NR  | NR      | NR  | NR      | NR  | NR      | NR  | Y   | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| IDAHO       | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| ILLINOIS    | NR  | NR      | Y   | Y       | NR  | NR      | NR  | NR  | NR  | Y   | Y       | NR    | NR      | NR   | NR      |
| INDIANA     | NR  | NR      | Y   | N       | Y   | Y       | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| IOWA        | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| KANSAS      | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | Y   | N       | NR    | NR      | NR   | NR      |
| KENTUCKY    | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| LOUISIANA   | Y   | N       | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| MAINE       | NR  | NR      | Y   | Y       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |

## Appendix B-9

# FACILITIES WHICH HANDLE LOST OR ABANDONED FERRETS

PFS = private ferret shelters  
HSS = humane society shelters  
WRC = wildlife rehabilitation centers  
ACC = animal control centers

SWA = state wildlife agency facilities  
SAA = state agriculture agency facilities  
SHA = state health agency facilities

| STATE          | PFS | PERMIT? | HSS | PERMIT? | WRC | PERMIT? | SWA | SAA | SHA | ACC | PERMIT? | OTHER | PERMIT? | NONE | UNKNOWN |
|----------------|-----|---------|-----|---------|-----|---------|-----|-----|-----|-----|---------|-------|---------|------|---------|
| MARYLAND       | Y   | N       | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| MASSACHUSETTS  | Y   | Y       | Y   | N       | NR  | NR      | Y   | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| MICHIGAN       | Y   | Y       | Y   | Y       | NR  | NR      | NR  | NR  | NR  | Y   | Y       | NR    | NR      | NR   | NR      |
| MINNESOTA      | NR  | NR      | NR  | NR      | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| MISSISSIPPI    | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| MISSOURI       | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | Y   | N       | NR    | NR      | NR   | NR      |
| MONTANA        | NR  | NR      | Y   | Y       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| NEBRASKA       | NR  | NR      | Y   | UNK     | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| NEVADA         | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| NEW HAMPSHIRE  | Y   | N       | Y   | N       | Y   | N       | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| NEW JERSEY     | Y   | Y       | Y   | Y       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| NEW MEXICO     | NR  | NR      | NR  | NR      | Y   | Y       | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| NEW YORK       | NR  | NR      | Y   | Y       | Y   | Y       | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| NORTH CAROLINA | NR  | NR      | NR  | NR      | NR  | NR      | N   | NR  | NR  | NR  | NR      | NR    | NR      | NR   | Y       |
| NORTH DAKOTA   | NR  | NR      | NR  | NR      | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | Y    | NR      |
| OHIO           | NR  | NR      | Y   | UNK     | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| OKLAHOMA       | NR  | NR      | NR  | NR      | NR  | NR      | NR  | NR  | NR  | Y   | UNK     | NR    | NR      | NR   | NR      |
| OREGON         | Y   | N       | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |

## Appendix B-9

# FACILITIES WHICH HANDLE LOST OR ABANDONED FERRETS

PFS = private ferret shelters  
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SWA = state wildlife agency facilities  
SAA = state agriculture agency facilities  
SHA = state health agency facilities

| STATE          | PFS | PERMIT? | HSS | PERMIT? | WRC | PERMIT? | SWA | SAA | SHA | ACC | PERMIT? | OTHER | PERMIT? | NONE | UNKNOWN |
|----------------|-----|---------|-----|---------|-----|---------|-----|-----|-----|-----|---------|-------|---------|------|---------|
| PENNSYLVANIA   | NR  | NR      | NR  | Y       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| RHODE ISLAND   | Y   | Y       | NR  | NR      | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| SOUTH CAROLINA | NR  | NR      | Y   | N       | Y   | N       | NR  | NR  | Y   | NR  | NR      | NR    | NR      | NR   | NR      |
| SOUTH DAKOTA   | NR  | NR      | NR  | NR      | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | Y       |
| TENNESSEE      | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| TEXAS          | Y   | N       | Y   | N       | Y   | N       | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| UTAH           | NR  | NR      | Y   | NR      | NR  | NR      | NR  | NR  | NR  | NR  | NR      | Y     | UNK     | NR   | NR      |
| VERMONT        | NR  | NR      | Y   | Y       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| VIRGINIA       | NR  | NR      | Y   | N       | Y   | Y       | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| WASHINGTON     | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| WEST VIRGINIA  | NR  | NR      | NR  | NR      | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | Y    | NR      |
| WISCONSIN      | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |
| WYOMING        | NR  | NR      | Y   | N       | NR  | NR      | NR  | NR  | NR  | NR  | NR      | NR    | NR      | NR   | NR      |

## Appendix B-9

# CAPTIVE BREEDING ACTIVITIES

1 = NOT RESTRICTED    2 = NOT ALLOWED    3 = UNDER STATE PERMIT    4 = UNDER LOCAL PERMIT

| STATE                                                                                                                                                                                                                                                                                                                                   | BREEDING FOR<br>PET TRADE | BREEDING TO<br>SUPPLY LABS | BREEDING<br>FOR FUR MARKET | BREEDING<br>FOR HUNTING | IMPT/POSS OF EUROPEAN<br>POLECATS FOR BREEDING | IMPT/POSS OF HYBRIDS<br>FOR BREEDING |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------|----------------------------|-------------------------|------------------------------------------------|--------------------------------------|
| ALABAMA                                                                                                                                                                                                                                                                                                                                 | 1                         | 1                          | 1                          | 1                       | 1                                              | 1                                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                |                           |                            |                            |                         |                                                |                                      |
| ALASKA                                                                                                                                                                                                                                                                                                                                  | 1                         | UNK                        | 1                          | 2                       | 3                                              | 3                                    |
| RESPONDER'S COMMENTS: ANY OTHER MUSTELID BESIDES FERRETS ( <i>Mustela putorius furo</i> ) ARE REGULATED BY THE STATE. FOR EXAMPLE EUROPEAN POLECATS OR HYBRIDS ARE ALLOWED ONLY UNDER SCIENTIFIC OR EDUCATIONAL PERMITS FROM THE DEPT. OF FISH & GAME. "BREEDING FERRETS TO SUPPLY LABORATORIES: UNKNOWN" (PERS. COMMUN. W/RESPONDENT). |                           |                            |                            |                         |                                                |                                      |
| ARIZONA                                                                                                                                                                                                                                                                                                                                 | NR                        | NR                         | NR                         | NR                      | NR                                             | NR                                   |
| RESPONDER'S COMMENTS: DO NOT REGULATE. "STATE WILDLIFE AGENCY DOES NOT REGULATE BREEDING." (PERS. COMMUN. W/RESPONDENT)                                                                                                                                                                                                                 |                           |                            |                            |                         |                                                |                                      |
| ARKANSAS                                                                                                                                                                                                                                                                                                                                | NR                        | NR                         | NR                         | NR                      | NR                                             | NR                                   |
| RESPONDER'S COMMENTS: NO REGULATIONS                                                                                                                                                                                                                                                                                                    |                           |                            |                            |                         |                                                |                                      |
| CALIFORNIA                                                                                                                                                                                                                                                                                                                              | 2                         | 2                          | 2                          | 2                       | 2                                              | 2                                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                                                                                |                           |                            |                            |                         |                                                |                                      |
| COLORADO                                                                                                                                                                                                                                                                                                                                | 3                         | NR                         | NR                         | NR                      | **                                             | NR                                   |
| RESPONDER'S COMMENTS: **SCIENTIFIC PROJECT INVOLVING THE IMPORTATION OR POSSESSION OF SIBERIAN POLECATS FOR BREEDING PURPOSES REQUIRES A USFWS WILDLIFE PERMIT. "BREEDERS NEED A STATE AG LICENSE TO BREED FERRETS FOR COMMERCIAL USES. OTHER BREEDING ACTIVITIES ARE NOT REGULATED." (PERS. COMMUN. W/RESPONDENT)                      |                           |                            |                            |                         |                                                |                                      |
| CONNECTICUT                                                                                                                                                                                                                                                                                                                             | 1                         | 1                          | 1                          | 2                       | UNK                                            | UNK                                  |
| RESPONDER'S COMMENTS: "DO NOT KNOW ABOUT EUROPEAN POLECATS OR HYBRIDS." (PERS. COMMUN. W/RESPONDENT)                                                                                                                                                                                                                                    |                           |                            |                            |                         |                                                |                                      |
| DELAWARE                                                                                                                                                                                                                                                                                                                                | 1                         | 1                          | 1                          | 1                       | 3                                              | 3                                    |
| RESPONDER'S COMMENTS: DEPARTMENT OF AGRICULTURE                                                                                                                                                                                                                                                                                         |                           |                            |                            |                         |                                                |                                      |
| FLORIDA                                                                                                                                                                                                                                                                                                                                 | 3                         | 3                          | 3                          | N/A                     | 3                                              | 3                                    |
| RESPONDER'S COMMENTS: ONLY PERMIT NEEDED IF FOR SALE OR EXHIBITION                                                                                                                                                                                                                                                                      |                           |                            |                            |                         |                                                |                                      |

# CAPTIVE BREEDING ACTIVITIES

1 = NOT RESTRICTED    2 = NOT ALLOWED    3 = UNDER STATE PERMIT    4 = UNDER LOCAL PERMIT

| STATE   | BREEDING FOR<br>PET TRADE | BREEDING TO<br>SUPPLY LABS | BREEDING<br>FOR FUR MARKET | BREEDING<br>FOR HUNTING | IMPT/POSS OF EUROPEAN<br>POLECATS FOR BREEDING | IMPT/POSS OF HYBRIDS<br>FOR BREEDING |
|---------|---------------------------|----------------------------|----------------------------|-------------------------|------------------------------------------------|--------------------------------------|
| GEORGIA | 3                         | 3                          | 3                          | 2                       | 3                                              | 3                                    |

RESPONDER'S COMMENTS: NR

HAWAII

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 2 | 2 | 2 | 2 | 2 | 2 | 2 |
|---|---|---|---|---|---|---|

RESPONDER'S COMMENTS: NR

IDAHO

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 |
|---|---|---|---|---|---|---|

RESPONDER'S COMMENTS: "NO RESTRICTIONS ON BREEDING SINCE FERRETS ARE CLASSIFIED AS DOMESTIC; ONE WOULD HAVE TO APPLY FOR A PERMIT ONLY IF THE FERRETS WERE TO BE RELEASED INTO THE WILD. NO DOMESTIC ANIMALS CAN BE RELEASED INTO THE WILD WITHOUT A PERMIT FROM THE FISH & GAME DEPT. NO RESTRICTIONS TO BREED FERRETS TO HUNT WITH, BUT FERRETS CANNOT BE BRED TO BE HUNTED." (PERS. COMMUN. W/RESPONDENT)

ILLINOIS

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 3 | 3 | 3 | 2 | 3 | 3 | 3 |
|---|---|---|---|---|---|---|

RESPONDER'S COMMENTS: NR

INDIANA

|    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|
| NR | NR | NR | NR | NR | NR | NR |
|----|----|----|----|----|----|----|

RESPONDER'S COMMENTS: NO PERMIT REQUIRED AS LONG AS THEY ARE NOT RELEASED OR SOLD FOR RELEASE.

IOWA

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 |
|---|---|---|---|---|---|---|

RESPONDER'S COMMENTS: NR

KANSAS

|   |   |   |   |     |     |     |
|---|---|---|---|-----|-----|-----|
| 1 | 1 | 1 | 1 | UNK | UNK | UNK |
|---|---|---|---|-----|-----|-----|

RESPONDER'S COMMENTS: "HAVE NO INFORMATION ON EUROPEAN POLECATS OR HYBRIDS" (PERS. COMMUN. W/RESPONDENT)

KENTUCKY

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 3 | 3 | 3 | 2 | 3 | 3 | 3 |
|---|---|---|---|---|---|---|

RESPONDER'S COMMENTS: NR

LOUISIANA

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 4 | 4 | 4 |
|---|---|---|---|---|---|---|

RESPONDER'S COMMENTS: GENERALLY NOT REGULATED, BUT SOME URBAN PARISHES MAY HAVE RESTRICTIONS ON IMPORTATION.

## Appendix B-10

# CAPTIVE BREEDING ACTIVITIES

1 = NOT RESTRICTED    2 = NOT ALLOWED    3 = UNDER STATE PERMIT    4 = UNDER LOCAL PERMIT

| STATE                                                                                                                                                                                                                                             | BREEDING FOR<br>PET TRADE | BREEDING TO<br>SUPPLY LABS | BREEDING<br>FOR FUR MARKET | BREEDING<br>FOR HUNTING | IMPT/POSS OF EUROPEAN<br>POLECATS FOR BREEDING | IMPT/POSS OF HYBRIDS<br>FOR BREEDING |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------|----------------------------|-------------------------|------------------------------------------------|--------------------------------------|
| MAINE                                                                                                                                                                                                                                             | 1                         | 1                          | UNK                        | UNK                     | UNK                                            | UNK                                  |
| RESPONDER'S COMMENTS: NO INFORMATION ON BREEDING FOR FUR MARKET, HUNTING, EUROPEAN POLECATS, OR HYBRIDS                                                                                                                                           |                           |                            |                            |                         |                                                |                                      |
| MARYLAND                                                                                                                                                                                                                                          | 1                         | 1                          | 1                          | 2                       | 2                                              | 1                                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                          |                           |                            |                            |                         |                                                |                                      |
| MASSACHUSETTS                                                                                                                                                                                                                                     | 3                         | 3                          | 3                          | 2                       | 3                                              | 3                                    |
| RESPONDER'S COMMENTS: EXCEPT FOR THE 1ST TWO ACTIVITIES, IT IS HIGHLY UNLIKELY THAT REQUESTS WOULD BE MADE FOR THE OTHER ACTIVITIES IN MASSACHUSETTS, AND EVEN THOUGH THE AGENCY COULD LEGALLY PERMIT THEM, IT IS UNLIKELY THAT THE AGENCY WOULD. |                           |                            |                            |                         |                                                |                                      |
| MICHIGAN                                                                                                                                                                                                                                          | 1                         | 1                          | 1                          | 1                       | 1                                              | 1                                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                          |                           |                            |                            |                         |                                                |                                      |
| MINNESOTA                                                                                                                                                                                                                                         | 1                         | 1                          | 1                          | 1                       | 1                                              | 1                                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                          |                           |                            |                            |                         |                                                |                                      |
| MISSISSIPPI                                                                                                                                                                                                                                       | 1                         | 3                          | 1                          | 1                       | 1                                              | 1                                    |
| RESPONDER'S COMMENTS: UNDER THE FEDERAL ANIM. (ANIMAL) WELFARE ACT, LABS REQUIRED TO HAVE A STATE PERMIT. (PERS. COMMUN. W/RESPONDENT)                                                                                                            |                           |                            |                            |                         |                                                |                                      |
| MISSOURI                                                                                                                                                                                                                                          | 4                         | 4                          | 4                          | 4                       | 4                                              | 4                                    |
| RESPONDER'S COMMENTS: "THESE ACTIVITIES MIGHT REQUIRE A PERMIT UNDER SOME CITY GOVERNMENT ORDINANCES." (PERS. COMMUN. W/RESPONDENT)                                                                                                               |                           |                            |                            |                         |                                                |                                      |
| MONTANA                                                                                                                                                                                                                                           | 1                         | 1                          | 1                          | 1                       | 1                                              | 1                                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                          |                           |                            |                            |                         |                                                |                                      |
| NEBRASKA                                                                                                                                                                                                                                          | 1                         | 1                          | 1                          | 2                       | 1                                              | 1                                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                          |                           |                            |                            |                         |                                                |                                      |



# CAPTIVE BREEDING ACTIVITIES

1 = NOT RESTRICTED    2 = NOT ALLOWED    3 = UNDER STATE PERMIT    4 = UNDER LOCAL PERMIT

| STATE                                                                                                                                                                                                                                                                        | BREEDING FOR<br>PET TRADE | BREEDING TO<br>SUPPLY LABS | BREEDING<br>FOR FUR MARKET | BREEDING<br>FOR HUNTING | IMPT/POSS OF EUROPEAN<br>POLECATS FOR BREEDING | IMPT/POSS OF HYBRIDS<br>FOR BREEDING |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------|----------------------------|-------------------------|------------------------------------------------|--------------------------------------|
| NEVADA                                                                                                                                                                                                                                                                       | NR                        | NR                         | NR                         | NR                      | NR                                             | NR                                   |
| RESPONDER'S COMMENTS: "GENERALLY, BREEDING IS NOT RESTRICTED, BUT HAVE NO INFORMATION ON THESE ACTIVITIES." (PERS. COMMUN. W/RESPONDENT)                                                                                                                                     |                           |                            |                            |                         |                                                |                                      |
| NEW HAMPSHIRE                                                                                                                                                                                                                                                                | 1                         | 1                          | 1                          | 2                       | UNK                                            | UNK                                  |
| RESPONDER'S COMMENTS: "DO NOT KNOW ABOUT EUROPEAN POLECATS OR HYBRIDS" (PERS. COMMUN. W/RESPONDENT)                                                                                                                                                                          |                           |                            |                            |                         |                                                |                                      |
| NEW JERSEY                                                                                                                                                                                                                                                                   | 3                         | 3                          | 3                          | 2                       | 3                                              | 3                                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                     |                           |                            |                            |                         |                                                |                                      |
| NEW MEXICO                                                                                                                                                                                                                                                                   | 1                         | 1                          | 1                          | 1                       | 1                                              | 1                                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                     |                           |                            |                            |                         |                                                |                                      |
| NEW YORK                                                                                                                                                                                                                                                                     | 3                         | 3                          | 3                          | 2                       | 1                                              | UNK                                  |
| RESPONDER'S COMMENTS: NOT AWARE OF HYBRIDS                                                                                                                                                                                                                                   |                           |                            |                            |                         |                                                |                                      |
| NORTH CAROLINA                                                                                                                                                                                                                                                               | 1                         | 1                          | 1                          | 1                       | 1                                              | 1                                    |
| RESPONDER'S COMMENTS: "EXOTICS, SUCH AS FERRETS, CAN NOT BE KEPT (OR BRED) TO BE HUNTED. THERE ARE NO RESTRICTIONS ON BREEDING FERRETS FOR HUNTING OTHER SMALL MAMMALS. I.E., RABBITS." (PERS. COMMUN. W/RESPONDENT)                                                         |                           |                            |                            |                         |                                                |                                      |
| NORTH DAKOTA                                                                                                                                                                                                                                                                 | 1                         | 1                          | 1                          | 1                       | 3                                              | 3                                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                     |                           |                            |                            |                         |                                                |                                      |
| OHIO                                                                                                                                                                                                                                                                         | N/A                       | N/A                        | N/A                        | N/A                     | N/A                                            | N/A                                  |
| RESPONDER'S COMMENTS: NO AUTHORITY TO REGULATE EXCEPT AS STATED IN 1533.02 (WILDLIFE LAW WHICH ADDRESSES POSSESSION OF A FERRET FOR HUNTING OR PEST CONTROL PURPOSES). "THESE ACTIVITIES MAY REQUIRE A PERMIT UNDER CITY OR COUNTY ORDINANCES." (PERS. COMMUN. W/RESPONDENT) |                           |                            |                            |                         |                                                |                                      |
| OKLAHOMA                                                                                                                                                                                                                                                                     | 1                         | 1                          | 1                          | 1                       | 3                                              | 3                                    |
| RESPONDER'S COMMENTS: NR                                                                                                                                                                                                                                                     |                           |                            |                            |                         |                                                |                                      |

## Appendix B-10

# CAPTIVE BREEDING ACTIVITIES

1 = NOT RESTRICTED    2 = NOT ALLOWED    3 = UNDER STATE PERMIT    4 = UNDER LOCAL PERMIT

| STATE  | BREEDING FOR<br>PET TRADE | BREEDING TO<br>SUPPLY LABS | BREEDING<br>FOR FUR MARKET | BREEDING<br>FOR HUNTING | IMPT/POSS OF EUROPEAN<br>POLECATS FOR BREEDING | IMPT/POSS OF HYBRIDS<br>FOR BREEDING |
|--------|---------------------------|----------------------------|----------------------------|-------------------------|------------------------------------------------|--------------------------------------|
| OREGON | 1                         | 1                          | 1                          | 1                       | 1                                              | 1                                    |

RESPONDER'S COMMENTS: "IMPORTATION & POSSESSION OF EUROPEAN POLECATS AND HYBRIDS FOR BREEDING PURPOSES ARE NOT RESTRICTED SINCE FERRETS, POLECATS AND HYBRIDS SHARE THE SAME SCIENTIFIC NAME." (PERS. COMMUN. W/RESPONDENT)

|              |   |   |   |   |   |   |
|--------------|---|---|---|---|---|---|
| PENNSYLVANIA | 1 | 1 | 1 | 2 | 1 | 1 |
|--------------|---|---|---|---|---|---|

RESPONDER'S COMMENTS: NR

|              |   |   |   |   |   |   |
|--------------|---|---|---|---|---|---|
| RHODE ISLAND | 2 | 2 | 2 | 2 | 2 | 2 |
|--------------|---|---|---|---|---|---|

RESPONDER'S COMMENTS: IMPORTATION OF NEUTERED FERRETS ONLY

|                |   |   |   |   |   |   |
|----------------|---|---|---|---|---|---|
| SOUTH CAROLINA | 1 | 1 | 1 | 1 | 1 | 1 |
|----------------|---|---|---|---|---|---|

RESPONDER'S COMMENTS: DO NOT OCCUR NATURALLY IN THE EAST; ONLY CONTROLLED FOR RABIES VECTOR AND PROHIBITION FOR SALE MAY BE LIFTED

|              |    |    |    |    |    |    |
|--------------|----|----|----|----|----|----|
| SOUTH DAKOTA | NR | NR | NR | NR | NR | NR |
|--------------|----|----|----|----|----|----|

RESPONDER'S COMMENTS: UNKNOWN

|           |   |   |   |   |   |   |
|-----------|---|---|---|---|---|---|
| TENNESSEE | 1 | 1 | 1 | 1 | 1 | 1 |
|-----------|---|---|---|---|---|---|

RESPONDER'S COMMENTS: NR

|       |   |   |   |   |   |   |
|-------|---|---|---|---|---|---|
| TEXAS | 1 | 1 | 1 | 1 | 1 | 1 |
|-------|---|---|---|---|---|---|

RESPONDER'S COMMENTS: NR

|      |   |   |   |   |   |   |
|------|---|---|---|---|---|---|
| UTAH | 2 | 2 | 1 | 2 | 2 | 2 |
|------|---|---|---|---|---|---|

RESPONDER'S COMMENTS: NR

|         |   |   |   |   |   |   |
|---------|---|---|---|---|---|---|
| VERMONT | 1 | 1 | 1 | 2 | 1 | 1 |
|---------|---|---|---|---|---|---|

RESPONDER'S COMMENTS: NR

# CAPTIVE BREEDING ACTIVITIES

1 = NOT RESTRICTED

2 = NOT ALLOWED

3 = UNDER STATE PERMIT

4 = UNDER LOCAL PERMIT

| STATE | BREEDING FOR     |                    | BREEDING TO           |                    | BREEDING                     |                     | IMPT/POSS OF EUROPEAN |  | IMPT/POSS OF HYBRIDS |  |
|-------|------------------|--------------------|-----------------------|--------------------|------------------------------|---------------------|-----------------------|--|----------------------|--|
|       | <u>PET TRADE</u> | <u>SUPPLY LABS</u> | <u>FOR FUR MARKET</u> | <u>FOR HUNTING</u> | <u>POLECATS FOR BREEDING</u> | <u>FOR BREEDING</u> |                       |  |                      |  |

1

1

1

1

1

1

1

1

1

1

1

WASHINGTON

1

1

1

1

1

1

1

1

1

1

RESPONDER'S COMMENTS: NR

WEST VIRGINIA

NR

NR

NR

NR

NR

NR

NR

NR

NR

NR

RESPONDER'S COMMENTS: HUNTING WITH FERRETS PROHIBITED; ALL OTHER ACTIVITIES UNDER STATE AGRICULTURAL AGENCY AUTHORITY; "A PERMIT MAY BE REQUIRED FROM THE DEPT OF AG." (PERS. COMMUN. W/RESPONDENT)

WISCONSIN

1

1

1

1

1

1

1

1

1

1

RESPONDER'S COMMENTS: NR

WYOMING

1

1

1

1

1

1

1

1

1

1

RESPONDER'S COMMENTS: NR

**BREEDING PERMITS: NUMBER & YEAR, FEES & LIMITS;  
USEFULNESS OF REGULATION**

| <u>STATE</u>                                                                                                                                                                 | <u>NUMBER<br/>OF PERMITS</u> | <u>YEAR</u> | <u>FEE STRUCTURE</u>                                                                                                                                                                                                                                   | <u>RESTRICTIONS OR LIMITS</u>                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| ALABAMA                                                                                                                                                                      | NR                           | NR          | NR                                                                                                                                                                                                                                                     | NR                                                                                                                                               |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                       |                              |             |                                                                                                                                                                                                                                                        |                                                                                                                                                  |
| ALASKA                                                                                                                                                                       | N/A                          | NR          | NR                                                                                                                                                                                                                                                     | NR                                                                                                                                               |
| HOW USEFUL IS REGULATING OWNERSHIP? N/A                                                                                                                                      |                              |             |                                                                                                                                                                                                                                                        |                                                                                                                                                  |
| ARIZONA                                                                                                                                                                      | NR                           | NR          | NR                                                                                                                                                                                                                                                     | NR                                                                                                                                               |
| HOW USEFUL IS REGULATING OWNERSHIP? N/A                                                                                                                                      |                              |             |                                                                                                                                                                                                                                                        |                                                                                                                                                  |
| ARKANSAS                                                                                                                                                                     | NR                           | NR          | NR                                                                                                                                                                                                                                                     | NR                                                                                                                                               |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                       |                              |             |                                                                                                                                                                                                                                                        |                                                                                                                                                  |
| CALIFORNIA                                                                                                                                                                   | N/A                          | NR          | NR                                                                                                                                                                                                                                                     | NR                                                                                                                                               |
| HOW USEFUL IS REGULATING OWNERSHIP? NEAR TOTAL PROHIBITION HAS NOT PREVENTED ILLEGAL IMPORTATION AND POSSESSION OF PET FERRETS.                                              |                              |             |                                                                                                                                                                                                                                                        |                                                                                                                                                  |
| COLORADO                                                                                                                                                                     | NR                           | NR          | NR                                                                                                                                                                                                                                                     | NR                                                                                                                                               |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                       |                              |             |                                                                                                                                                                                                                                                        |                                                                                                                                                  |
| CONNECTICUT                                                                                                                                                                  | N/A                          | NR          | NR                                                                                                                                                                                                                                                     | NR                                                                                                                                               |
| HOW USEFUL IS REGULATING OWNERSHIP? N/A                                                                                                                                      |                              |             |                                                                                                                                                                                                                                                        |                                                                                                                                                  |
| DELAWARE                                                                                                                                                                     | N/A                          | NR          | NR                                                                                                                                                                                                                                                     | NR                                                                                                                                               |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                       |                              |             |                                                                                                                                                                                                                                                        |                                                                                                                                                  |
| FLORIDA                                                                                                                                                                      | NR                           | NR          | NR                                                                                                                                                                                                                                                     | NR                                                                                                                                               |
| HOW USEFUL IS REGULATING OWNERSHIP? ADEQUATELY                                                                                                                               |                              |             |                                                                                                                                                                                                                                                        |                                                                                                                                                  |
| GEORGIA                                                                                                                                                                      | 3                            | 1996        | \$236 FOR ONE YEAR PERMIT                                                                                                                                                                                                                              | SEE ATTACHED - GEORGIA WILD ANIMAL LAW                                                                                                           |
| HOW USEFUL IS REGULATING OWNERSHIP? WE FEEL THAT BY REQUIRING SEXUAL ALTERATION OF FERRETS HELD AS PETS, WE REDUCE THE POSSIBILITY OF A POPULATION ESTABLISHING IN THE WILD. |                              |             |                                                                                                                                                                                                                                                        |                                                                                                                                                  |
| HAWAII                                                                                                                                                                       | NR                           | NR          | NR                                                                                                                                                                                                                                                     | NR                                                                                                                                               |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                       |                              |             |                                                                                                                                                                                                                                                        |                                                                                                                                                  |
| IDAHO                                                                                                                                                                        | NR                           | NR          | NR                                                                                                                                                                                                                                                     | NR                                                                                                                                               |
| HOW USEFUL IS REGULATING OWNERSHIP? N/A                                                                                                                                      |                              |             |                                                                                                                                                                                                                                                        |                                                                                                                                                  |
| ILLINOIS                                                                                                                                                                     | 671                          | 1996        | CLASS A - FREE; CLASS B - \$10<br>THE 671 ARE CLASS A PERMITS;<br>UNKNOWN NUMBER OF CLASS<br>B PERMITS; CLASS A PERMITS<br>ARE ISSUED TO POSSESS<br>FERRETS AS PETS AND ARE<br>FREE. TRUE NUMBER OF<br>FERRETS BEING HELD AS PETS<br>IS LIKELY HIGHER. | COPY OF REGULATIONS ATTACHED;<br>CLASS B PERMIT HOLDERS CAN BREED<br>OTHER SPECIES IN CAPTIVITY; FERRET<br>BREEDERS CAN NOT BE SEPARATED<br>OUT. |

**Appendix B-11**

**BREEDING PERMITS: NUMBER & YEAR, FEES & LIMITS;  
USEFULNESS OF REGULATION**

| <u>STATE</u>                                                                                                                                                                                                                                                                               | <u>NUMBER<br/>OF PERMITS</u> | <u>YEAR</u> | <u>FEE STRUCTURE</u>                                                                                                                                          | <u>RESTRICTIONS OR LIMITS</u>                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| HOW USEFUL IS REGULATING OWNERSHIP? CURRENT SYSTEM IS ADEQUATE GIVEN EXISTING ENVIRONMENTAL CONCERNS. HOWEVER, HIGHER FEES ARE OBVIOUSLY REQUIRED TO RECOVER ADMINISTRATIVE COSTS.                                                                                                         |                              |             |                                                                                                                                                               |                                                                      |
| INDIANA                                                                                                                                                                                                                                                                                    | N/A                          | NR          | NR                                                                                                                                                            | NR                                                                   |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                     |                              |             |                                                                                                                                                               |                                                                      |
| IOWA                                                                                                                                                                                                                                                                                       | NR                           | NR          | MR                                                                                                                                                            | NR                                                                   |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                     |                              |             |                                                                                                                                                               |                                                                      |
| KANSAS                                                                                                                                                                                                                                                                                     | NR                           | NR          | NR                                                                                                                                                            | NR                                                                   |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                     |                              |             |                                                                                                                                                               |                                                                      |
| KENTUCKY                                                                                                                                                                                                                                                                                   | 35                           | 1995        | \$50/YEAR; A PERSON BUYING, SELLING, POSSESSING, PROPAGATING, OR EXHIBITING WILDLIFE FOR COMMERCIAL PURPOSES MUST HAVE A COMMERCIAL PET & PROPAGATION PERMIT. | WILDLIFE SHALL ONLY BE OBTAINED FROM PERMITTED OR QUALIFIED SOURCES. |
| HOW USEFUL IS REGULATING OWNERSHIP? VERY LITTLE. WE HAVE NO IDEA HOW MANY FERRETS ARE IN THE STATE, BECAUSE MANY ARE PROBABLY KEPT ILLEGALLY. WE HAVE NOT MADE A CONCERTED EFFORT TO ADDRESS ENVIRONMENTAL CONCERNS, THOUGH WE ARE IN THE PROCESS OF REVIEWING OUR PET & PROPAGATION REGS. |                              |             |                                                                                                                                                               |                                                                      |
| LOUISIANA                                                                                                                                                                                                                                                                                  | NR                           | NR          | NR                                                                                                                                                            | NR                                                                   |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                     |                              |             |                                                                                                                                                               |                                                                      |
| MAINE                                                                                                                                                                                                                                                                                      | NR                           | NR          | NR                                                                                                                                                            | NR                                                                   |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                     |                              |             |                                                                                                                                                               |                                                                      |
| MARYLAND                                                                                                                                                                                                                                                                                   | NR                           | NR          | NR                                                                                                                                                            | NR                                                                   |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                     |                              |             |                                                                                                                                                               |                                                                      |
| MASSACHUSETTS                                                                                                                                                                                                                                                                              | 0                            | 1996        | EXPECTED TO BE \$1,000 PER YEAR; THE STATUTE REQUIRES THAT IT BE NO LESS. THE FIRST BREEDING PERMITS WILL BE ISSUED IN 1997.                                  | NOT YET FINALIZED                                                    |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                     |                              |             |                                                                                                                                                               |                                                                      |
| MICHIGAN                                                                                                                                                                                                                                                                                   | NR                           | NR          | NR                                                                                                                                                            | NR                                                                   |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                     |                              |             |                                                                                                                                                               |                                                                      |
| MINNESOTA                                                                                                                                                                                                                                                                                  | NR                           | NR          | NR                                                                                                                                                            | NR                                                                   |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                     |                              |             |                                                                                                                                                               |                                                                      |
| MISSISSIPPI                                                                                                                                                                                                                                                                                | NR                           | NR          | NR                                                                                                                                                            | NR                                                                   |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                     |                              |             |                                                                                                                                                               |                                                                      |

**Appendix B-11**

**BREEDING PERMITS: NUMBER & YEAR, FEES & LIMITS;  
USEFULNESS OF REGULATION**

| <u>STATE</u>                                                                                                                                                                  | <u>NUMBER<br/>OF PERMITS</u> | <u>YEAR</u> | <u>FEE STRUCTURE</u>                                                                       | <u>RESTRICTIONS OR LIMITS</u>                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MISSOURI                                                                                                                                                                      | NR                           | NR          | NR                                                                                         | NR                                                                                                                                                                |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                        |                              |             |                                                                                            |                                                                                                                                                                   |
| MONTANA                                                                                                                                                                       | NR                           | NR          | NR                                                                                         | NR                                                                                                                                                                |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                        |                              |             |                                                                                            |                                                                                                                                                                   |
| NEBRASKA                                                                                                                                                                      | NR                           | NR          | NR                                                                                         | NR                                                                                                                                                                |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                        |                              |             |                                                                                            |                                                                                                                                                                   |
| NEVADA                                                                                                                                                                        | NR                           | NR          | NR                                                                                         | NR                                                                                                                                                                |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                        |                              |             |                                                                                            |                                                                                                                                                                   |
| NEW HAMPSHIRE                                                                                                                                                                 | NR                           | NR          | NR                                                                                         | NR                                                                                                                                                                |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                        |                              |             |                                                                                            |                                                                                                                                                                   |
| NEW JERSEY                                                                                                                                                                    | ~3500                        | 1996        | PET SHOP / ANIMAL DEALER = \$100; SCIENTIFIC = \$35; PET - \$10; ZOOLOGICAL EXHIBIT = \$60 | FERRET MUST BE KEPT SO AS TO PREVENT ESCAPE OR INJURY TO PUBLIC.                                                                                                  |
| HOW USEFUL IS REGULATING OWNERSHIP? VERY USEFUL, AS IT INFORMS THE PUBLIC OF THEIR RESPONSIBILITIES, I.E., NON-RELEASE, PREVENTION OF INJURY TO THE PUBLIC, PROPER CARE, ETC. |                              |             |                                                                                            |                                                                                                                                                                   |
| NEW MEXICO                                                                                                                                                                    | NR                           | NR          | NR                                                                                         | NR                                                                                                                                                                |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                        |                              |             |                                                                                            |                                                                                                                                                                   |
| NEW YORK                                                                                                                                                                      | 6000                         | 1996        | \$10 FEE PER LICENSE                                                                       | SEE ENCLOSED - LICENSEE CAN ONLY DISPOSE OF A FERRET TO AN INDIVIDUAL WHO POSSESSES A VALID FERRET LICENSE. LICENSEE MUST SUBMIT A WRITTEN REPORT IN SUCH A CASE. |
| HOW USEFUL IS REGULATING OWNERSHIP? NOT USEFUL; AGENCY HAS ATTEMPTED TO AMEND LAW TO ELIMINATE NEED FOR A STATE LICENSE.                                                      |                              |             |                                                                                            |                                                                                                                                                                   |
| NORTH CAROLINA                                                                                                                                                                | N/A                          | NR          | NR                                                                                         | NR                                                                                                                                                                |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                        |                              |             |                                                                                            |                                                                                                                                                                   |
| NORTH DAKOTA                                                                                                                                                                  | NR                           | NR          | NR                                                                                         | NR                                                                                                                                                                |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                        |                              |             |                                                                                            |                                                                                                                                                                   |
| OHIO                                                                                                                                                                          | NR                           | NR          | NR                                                                                         | NR                                                                                                                                                                |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                        |                              |             |                                                                                            |                                                                                                                                                                   |
| OKLAHOMA                                                                                                                                                                      | NR                           | NR          | NR                                                                                         | NR                                                                                                                                                                |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                        |                              |             |                                                                                            |                                                                                                                                                                   |

**Appendix B-11**



**BREEDING PERMITS: NUMBER & YEAR, FEES & LIMITS;  
USEFULNESS OF REGULATION**

| <u>STATE</u>                                                                                                                                                                                                                                                                                            | <u>NUMBER<br/>OF PERMITS</u> | <u>YEAR</u> | <u>FEE STRUCTURE</u> | <u>RESTRICTIONS OR LIMITS</u> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------|----------------------|-------------------------------|
| OREGON                                                                                                                                                                                                                                                                                                  | NR                           | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                                  |                              |             |                      |                               |
| PENNSYLVANIA                                                                                                                                                                                                                                                                                            | NR                           | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                                  |                              |             |                      |                               |
| RHODE ISLAND                                                                                                                                                                                                                                                                                            | NR                           | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? MOST PERSPECTIVE (SIC) & CURRENT FERRET OWNERS SEEK TO COMPLY W/ REGULATIONS W/O MUCH EFFORT FROM OUR AGENCY. THE "COLLEGE" ELEMENT IS PROBABLY OUR WORSE (SIC) OFFENDERS BUT WE DO NOT GO DORM TO DORM, ENFORCING. FEW ESCAPES ARE REPORTED W/ ANY ASSOC. PROBLEM. |                              |             |                      |                               |
| SOUTH CAROLINA                                                                                                                                                                                                                                                                                          | 0                            | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? N/A                                                                                                                                                                                                                                                                 |                              |             |                      |                               |
| SOUTH DAKOTA                                                                                                                                                                                                                                                                                            | NR                           | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                                  |                              |             |                      |                               |
| TENNESSEE                                                                                                                                                                                                                                                                                               | NR                           | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                                  |                              |             |                      |                               |
| TEXAS                                                                                                                                                                                                                                                                                                   | N/A                          | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                                  |                              |             |                      |                               |
| UTAH                                                                                                                                                                                                                                                                                                    | NR                           | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                                  |                              |             |                      |                               |
| VERMONT                                                                                                                                                                                                                                                                                                 | NR                           | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                                  |                              |             |                      |                               |
| VIRGINIA                                                                                                                                                                                                                                                                                                | NR                           | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                                  |                              |             |                      |                               |
| WASHINGTON                                                                                                                                                                                                                                                                                              | NR                           | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                                  |                              |             |                      |                               |
| WEST VIRGINIA                                                                                                                                                                                                                                                                                           | NR                           | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? R                                                                                                                                                                                                                                                                   |                              |             |                      |                               |
| WISCONSIN                                                                                                                                                                                                                                                                                               | NR                           | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                                  |                              |             |                      |                               |
| WYOMING                                                                                                                                                                                                                                                                                                 | NR                           | NR          | NR                   | NR                            |
| HOW USEFUL IS REGULATING OWNERSHIP? NR                                                                                                                                                                                                                                                                  |                              |             |                      |                               |

**Appendix B-11**

## Exhibit H Explanation

Exhibit H contains the official response from the California Fish and Game Commission to a formal request regarding ferret regulations. This exhibit is critical as it illustrates the Commission's position, their interpretation of the law, and their justification (or lack thereof) for maintaining the ban. It also provides evidence of the regulatory process—or procedural barriers—faced by those seeking policy changes. By including this exhibit, we highlight the need for transparency, accountability, and a reevaluation of outdated regulations that do not align with scientific or legal standards.

**Commissioners**  
**Erika Zavaleta**, President  
Santa Cruz

**Samantha Murray**, Vice President  
La Jolla

**Jacque Hostler-Carmesin**, Member  
McKinleyville

**Eric Sklar**, Member  
St. Helena

**Darius W. Anderson**, Member  
Kenwood

STATE OF CALIFORNIA  
Gavin Newsom, Governor

## Fish and Game Commission



*Wildlife Heritage and Conservation  
Since 1870*

**Melissa A. Miller-Henson**  
**Executive Director**  
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February 20, 2025

Pat Wright  
4515 Panorama Drive  
La Mesa, CA 91941

Sent via email to [pat@pan.sdcoxmail.com](mailto:pat@pan.sdcoxmail.com)

### **Re: Public Records Act Request No. R014294-021225**

Dear Pat Wright:

This letter is to confirm that the California Fish and Game Commission (Commission) received your Public Records Act ("PRA") request by GovQA, in which you are seeking copies of:

- Any and all scientific studies, reports, memos, or other documentation used by the Commission or the California Department of Fish and Wildlife (Department) to determine that domestic ferrets (*Mustela putorius furo*) are "not normally domesticated in California" under Title 14, Section 671, subsections (b) and (c);
- any internal communications (emails, memos, meeting notes, or reports) discussing the classification of domestic ferrets under California Fish and Game Code sections 2116, 2116.5, and 2118;
- any environmental risk assessments evaluating the impact of domestic ferrets on native wildlife, agriculture, or public health, produced by or reviewed by the Commission; and
- any records related to the denial of past petitions (PET 2016-008, PET 2019-018, or similar) requesting ferret reclassification, including internal discussions or justifications for rejection.

Records requested have a date range from January 1, 1931 through February 12, 2025.

The Commission has determined it will comply with your request by providing any responsive documents that are not exempt from disclosure. The Commission will attempt to make any responsive documents available within 90 days. After the Commission has located and assembled any non-exempt responsive documents, we will contact you.

Responsive documents in electronic format, in most cases, will be uploaded to GovQA for immediate access at no charge. If any electronic files are too large to upload to GovQA, they will be sent on DVD via U.S. Postal Service; there is a \$2.00 charge per DVD if more than five are needed. For hard copy documents, there is a photocopying fee of \$.30 per page. Shipping fees will be added for the direct cost associated with shipping any requested materials via DVD or in hard copy. Documents located in response to your request can always be viewed at the location where they are held without charge.

If you have any questions regarding this matter or would like to know the status of your request, please contact Cynthia McKeith at [FGC@fgc.ca.gov](mailto:FGC@fgc.ca.gov).

Sincerely,

  
Melissa Miller-Henson  
Executive Director

## Exhibit I Explanation

Exhibit I contains the Fish and Game Commission's staff summary from 2016 regarding ferret legalization. The report acknowledges that ferrets pose no significant agricultural risks, that rabies concerns can be mitigated with vaccinations, and that ferrets are unlikely to form feral populations. Despite these findings, the Commission still denied legalization, citing the need for an Environmental Impact Report (EIR)—a requirement that was not imposed when the Asian water buffalo was legalized. The exhibit highlights the inconsistency and lack of scientific justification for maintaining the ferret ban. It further demonstrates that no hearings or studies have ever justified classifying ferrets as wild and detrimental, as confirmed through a Public Records Act request. This exhibit is crucial in exposing regulatory contradictions and demanding factual justification for the continued prohibition of ferrets in California.

STATE OF CALIFORNIA  
**FISH AND GAME COMMISSION**  
**MEMORANDUM**

**DATE:** October 10, 2016

**TO:** Members of Fish and Game Commission

**FROM:** Mike Yaun (Legal Counsel) and  
Erin Chappell (Wildlife Advisor)

**SUBJECT:** Considerations for Ferret Legalization Associated with Petition #2016-008

Commission staff has drafted this memo to provide a detailed explanation for the staff recommendation regarding regulatory petition #2016-008 scheduled for Commission action under Agenda Item 32, Non-Marine Regulatory Petitions at its October 19-20, 2016 meeting.

### **Regulatory Overview**

Petition #2016-008 requests the Commission amend Title 14 CCR Section 671(c)(2)(K) by removing any reference to domestic ferrets. Section 671 (Importation, Transportation and Possession of Live Restricted Animals) states that it is unlawful to import, transport, or possess live animals, restricted in subsection (c) except under a permit issued by the Department of Fish and Wildlife (DFW). The regulation specifically states in Section 671(b) that "the commission has determined the [animals listed in subsection (c)] are not normally domesticated in this state." Currently, all species in the Family Mustelidae, including ferrets are listed in subsection (c). Within Section 671, ferrets are further designated as "detrimental animals" because they pose a threat to native wildlife, the agricultural interests of the State, or to public health and safety.

Applicable Fish and Game Code sections include:

- Section 2 - Unless the provisions or the context otherwise requires, the definitions in this chapter [Div .5, Ch 1 of the Fish and Game Code] govern the construction of this code and all regulations adopted under this code.
- Section 54 – "Mammal" means a wild or **feral mammal** or part of a wild or feral animal, but not a wild, feral, or undomesticated burro.
- Section 89.5 – "Wildlife" means and includes all **wild** animals, birds, plants, fish, amphibians, reptiles, and related ecological communities, including the habitat upon which the wildlife depends for its continued viability.
- Section 2116 – As used in this chapter [Div. 3, Ch. 2 of the Fish and Game Code], "wild animal" means any animal of the class ... Mammalia (mammals ...



which is **not normally domesticated in this state as determined by the commission.**

- Section 2118 – Prohibited importation or release into state of live wild animals of listed species, except under revocable, nontransferable permit.
- Section 2120(a) – The commission, in cooperation with the California Department of Food and Agriculture (CDFA), shall adopt regulations governing both (1) entry, importation, possession, transportation, keeping, confinement, or release of any and all wild animals imported pursuant to Chapter; and (2) the possession of all other wild animals. Regulations shall be designed to prevent damage to native wildlife and agriculture and to provide for welfare of the animal and safety of the public

Any change to the regulation would require coordination with CDFA and the proposed action would effectively eliminate the Commission's authority to regulate ferrets, with the exception of escaped individuals to the extent those individuals could be shown to have reverted to a wild state.

### **Supporting Documentation**

Submitted with the petition were two pieces of supporting documentation: A report published by Dr. G.O. Graening (California State University, Sacramento) in 2010 and a CEQA checklist. The report, *Analysis of the Potential Impacts of Domesticated Ferrets Upon Wildlife, Agriculture, and Human Health in North America, with a Focus Upon California, Based Upon Literature Review and Survey of North American Governmental Agencies*, provides an accurate summarization of much of the existing information on domestic ferrets. The purpose of the report was to fully summarize the body of knowledge on the domesticated ferret (*Mustela putorius furo*) for potential impacts and an analysis to identify potentially significant issues so that Commission could proceed with the preparation of an Environmental Impact Report (EIR). The report identified three items that may need further analysis in an EIR: 1) the potential for the establishment of feral breeding populations; 2) potential impacts of ferrets on wildlife, either from an established population or from intentionally or inadvertently released ferrets; and 3) the potential economic impacts both beneficial and adverse of ferret legalization. The report also identified three items that may not need further analysis in an EIR: 1) the potential impacts to agriculture since there is no indication of impacts found in the literature or from a questionnaire of agricultural departments; 2) the potential impacts to human health from rabies, noting that impacts could be mitigated to a less than significant impact with required vaccination; and 3) the potential impacts to human safety from biting, noting that with effective mitigation measures this could be reduced to a less than significant impact.

Regarding potential impacts to wildlife populations, the report finds that while the establishment of feral colonies is improbable, there is a possibility that escaped ferrets might do significant damage to wildlife, such as ground-nesting birds or listed species, during a period up to a few weeks of survival (see Chapter 8, Section 2.2). It further notes that ongoing intentional releases or inadvertent escapes might replenish the population in the wild which could pose a continued hazard to wildlife. In addition, the

report states that while pet-store ferrets do not possess the necessary traits to become invasive, pole-cat-ferret hybrids and polecats may possess the necessary traits. The report notes that both fertile ferrets and polecat-ferret hybrids are advertised for sale online. Therefore, some risk of them establishing a breeding population remains. How great a risk that poses to California's unique biodiversity remains unclear.

The CEQA Checklist provided identified biological resources, land use planning, and mandatory finding of significance as environmental factors potentially affected by the proposed change in regulation. For all three, the determination was that those impacts may be less than significant with mitigation. While the checklist did not identify any potentially significant impacts related to greenhouse gas emissions, the discussion section was not included in the materials provided. More broadly, the document does not include discussions about some of the conclusions found in the report - notably, the need to further analyze the potentially significant impacts to wildlife from the establishment of a feral breeding population of ferrets in an EIR or a discussion of the full breadth of the potential ramifications of legalization, such as the increased potential for polecat and polecat-ferret hybrids.

Even ignoring the omissions in the checklist outlined above, the findings require at a minimum, that the Commission develop a mitigated negative declaration before adopting the regulation. However, the Commission would not have authority to ensure that the proposed mitigation measures are implemented because the Commission does not have authority over domestic animals. Based on the inability to implement that mitigation, a full EIR is needed, even if founded on the existing checklist. It is important to note that if potentially significantly impacts are found in the EIR the adoption of that EIR would require a statement of overriding concern due to authority issues associated with mitigation.

### **Process for Preparing an EIR**

As the Lead Agency under CEQA, the Commission would be responsible for preparing the EIR. Previously, the Commission directed that any new petitioner would need to fund the preparation of an environmental document, in this case an EIR, before considering any changes in the current regulation. Project proponent-funded environmental documents have been used by other agencies. For example, DFW has contract mechanism in place for this type of CEQA analysis. DFW adopted regulations (see Title 14 CCR sections 789.0-789.6) to allow for a special contract selection process. Through this process a project proponent contracts with DFW to pay for the contractor's work and DFW directs a previously-approved consultant to prepare the environmental document through the retainer contracts authorized in the regulations. The Commission would need to establish a similar process through regulations to pursue the development of a petitioner-funded EIR.

### **FGC Staff Recommendation**

Staff recommends denying the petition. Given that the proposed action would effectively eliminate the Commission's authority to regulate ferrets, the potentially

significant impacts to wildlife identified in the report, and the inability of the Commission to implement any identified mitigation measures, staff does not recommend removing ferrets from the list of restricted species at this time. However, if the Commission would like to move forward with the preparation of an EIR to further evaluate the potential impacts, staff recommends developing regulations to establish a contract selection process similar to the DFW regulations and proceed with a petitioner-funded EIR.

Finally, it is important to note that this issue is not specific to ferrets. Other species that are sometimes kept as domestic pets, such as hedgehogs and sugar gliders (species of possum), are also included in the list of restricted species. Any requests to remove them from the list would require similar considerations.



April 10, 2025

California Fish and Game Commission  
P.O. Box 944209  
Sacramento, CA 94244-2090

**SUBJECT: Petition For Regulation Change (2025-03) Ferrets – EXHIBIT UPDATES and ADDITIONS**

Dear Commissioners:

**allFerrets** is a nonprofit educational online organization that provides scientific and educational information about the domestic ferret and other Mustelids for the general Public.

With over >14,000 “followers” on Facebook from across North American and the globe, we express our support for Petition 2025-03 to delist the domestic ferret (*Mustela putorius furo*) as a “wild” animal, thereby removing the ferret from the category of “restricted” animals in the State of California.

To bolster this support, we provide the following updates and additional information for your consideration in your review of the referenced Petition:

**ADDENDUM TO EXHIBIT B: Authoritative Position on Ferrets as a Domestic Species – attached)**

The ferret is widely recognized as a domestic species by current mainstream Scientific, Academic, Veterinary-Medical, and US Governmental, and Regulatory organizations.

**ADDENDUM to EXHIBIT E: We submit two peer-reviewed articles – attached]**

The comprehensive publication shown at Exhibit E was undoubtedly current in 2010. However, more recent data are available. We provide the following two peer-reviewed publications that report on a scientifically conducted survey of the government agencies in the US and Canada. This single-blinded survey was conducted by a wildlife biology consultancy to document the impact of the three domestic carnivores - dogs, cats and ferrets-- on the environment, wildlife, health, and agriculture of the United States, the Provinces of Canada and specifically, the counties of California. Excerpts regarding the ferret, are below.

**Lepe, A, et al. Environmental impact and relative invasiveness of free-roaming domestic carnivores – a North American survey of government agencies. *Animals* 7(78), 2017.**

*“Results confirm the existence of free-roaming cats and dogs throughout North America, as well as their profound impact on native wildlife, with cats being the major offenders. **Except for an occasional stray, free-roaming ferrets were “never” or “rarely seen”; no agency reported that ferrets caused environmental harm.** This is the first study to compare the relative impact of free-roaming dogs, cats, and ferrets. It shows differences in how these three animals react to novel environments. **For the US and Canada, free roaming cats and dogs meet the definition of an***

*“invasive” species, whereas ferrets do not. However, the way we as a society view these animals, our attitudes and perceptions, may influence how governmental agencies manage and control them.”*

**Lepe A, et al. Impact of free-roaming domestic carnivores on North American agriculture: a survey of government agencies. Veterinary Sciences and Medicine 3(1), 2020.**

*“As part of a larger environmental survey, government agencies of the United States and Canada were queried regarding the number and frequency of sightings of unconfined dogs, cats, and ferrets in agricultural areas, evidence for harm, and resulting degree of concern for livestock, agricultural crops, and fisheries. Of the 119 jurisdictions queried, 107 (89.9%) had agriculture components. Twenty-five (23.4%) reported the existence of “incidents” (impact) from unconfined dogs and cats on agriculture, which 14 (13.0%) agencies rated as “definitely a concern” to livestock and crops. Cat sightings exceeded those for dogs in both frequency and absolute animal numbers, although differences did not reach statistical significance. Twenty-one (19.6%) respondents reported ferrets as “rarely” or “never seen” in agricultural settings, and no agency reported an impact from ferrets on livestock, fisheries, or crops.”*

*“.....Notably absent are sightings of unconfined ferrets. No state or provincial agency reports incidents from ferrets and, despite the state’s official position that damage from unconfined ferrets is “well-documented,” none of the California county agencies report ferret sightings, recording them as “historical” or “never.” All agencies rank “existence of incidents” from ferrets as “probably does not exist” or “definitely does not exist.” Furthermore, the CA county agencies rank the presence of ferrets in rural and agricultural areas at the lowest “degree of concern,” with county Ag agencies rating ferrets of “no concern” to agriculture. In particular, the CA counties report “no concern” regarding the impact of ferrets on either “Poultry” and “Rabbits,” two agricultural species that the state considers to be prey for “feral ferrets.”*

**UPDATE to EXHIBIT F (page 214): Ferrets NOT banned in the District of Columbia.**

The current submission incorrectly states that ferrets are “banned” in the District of Columbia. In March 2018, DC overturned its ban on ferrets. Ferrets are now legal in DC. See the DC Code, attached.

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As a former California resident, I am keenly aware of the 40-year “quest” to legalize domestic ferrets in the State. Over the decades the State’s expressed “concerns” regarding the impact of ferrets have been hypothetical at best, and hyperbolic at worst. It is time for California to reconsider its stance on the domestic ferret and allow the legal possession, sale and ownership of this wonderful pet species.

We encourage your prudent review of the current scientific and regulatory basis for making this long-awaited change in California Code.

Sincerely,



F. A. Hoffman, MD - CEO  
[Captain, United States Public Health Service – Retired]

Attachments: (4)

**ADDENDUM TO EXHIBIT B:** “What is the most authoritative proof that domestic ferrets are domestic?”

The ferret (*Mustela putorius furo*) is widely recognized as a “domestic” species. Originally recognized by Linnaeus in 1758, the ferret is recognized as a domestic species by current Scientific, Academic, Veterinary-Medical, and US Governmental and Regulatory organizations that include, but are not limited to, the following:

1. **American Society of Mammologists:**  
<https://www.mammalsociety.org/image-library/mustela-furo-589>
2. **United States Government:**
  - **US Fish and Wildlife Service**  
<https://www.fws.gov/species/domestic-ferret-mustela-putorius-furo>
  - **US Department of Agriculture (USDA):**  
<https://www.aphis.usda.gov/pet-travel/another-country-to-us-import/ferrets>
  - **US Food and Drug Administration (FDA):** From the FDA Center for Veterinary Medicine:  
<https://www.fda.gov/animal-veterinary/animal-health-literacy/fun-ferret-facts>
  - **US Centers for Disease Control and Prevention (CDC):**  
<https://www.cdc.gov/healthy-pets/about/ferrets.html>
3. **American Veterinary Medical Association (AVMA):**  
<https://www.avma.org/resources/pet-owners/petcare/selecting-pet-ferret>
4. **Animal Diversity Web (University of Michigan Department of Zoology):** lists *M. putorius furo* as a subspecies of *M. putorius* (European polecat) as a “domestic species.”  
[https://animaldiversity.org/accounts/Mustela\\_putorius\\_furo/classification/](https://animaldiversity.org/accounts/Mustela_putorius_furo/classification/)
5. **The Britannica Encyclopedia:** lists the ferret as either the domestic “common” ferret (*M. putorius furo*) or the wild black-footed ferret (*M. nigripes*).  
<https://www.britannica.com/animal/ferret>
6. **Global Biodiversity Information Facility (GBIF)**—“is an international network and data infrastructure funded by the world's governments and aimed at providing anyone, anywhere, open access to data about all types of life on Earth.”  
<https://www.gbif.org/species/5218913>
7. **MSD (Merck) Veterinary Manual (2024):**  
<https://www.msdsvetmanual.com/exotic-and-laboratory-animals/ferrets/overview-of-ferrets>
8. **Integrated Taxonomic Information System (ITIS):** “ferrets –*Mustela putorius furo* Linnaeus, 1758 – valid – domestic ferret”
9. **The Biology and Diseases of the Ferret** (3<sup>rd</sup> Ed, 2014). Chapter: Taxonomy, History, and Use. Editors: James G Fox, PhD Professor of Biological Engineering, Emeritus, Massachusetts Institute of Technology and Robert P. Marini, DVM – MIT.  
<https://onlinelibrary.wiley.com/doi/book/10.1002/9781118782699>
10. **Walker’s Mammals of the World** (Book) Ed. RM Nowak. 1999 (6<sup>th</sup> edition). Lists the ferret as domestic species.



## EXHIBIT F: UPDATE [CORRECTION] CURRENT DISTRICT OF COLUMBIA CODE ON ANIMALS (FERRETS) as of March 30, 2018.




### You Are Here

[D.C. Law Library](#)  
[Code of the District of Columbia](#)  
[Title 8, Environmental and Animal Control and Protection](#)  
[Chapter 18, Animal Control](#)  
[Subchapter I, General](#)  
[§ 8-1808, Prohibited conduct](#)

### Previous

[§ 8-1807, Adoption](#)

### Next

[§ 8-1808.01, Dog parks](#)  
[\[Recodified\]](#)

### Publication Information

Current through Mar. 30, 2018

Last codified D.C. Law:  
Law 22-69 effective Mar. 30, 2018

Last codified Emergency Law:

Act 21-354 effective Mar. 23, 2016

Last codified Federal Law:  
Public Law approved May 5, 2017

Report Error

## § 8-1808. Prohibited conduct.

(a)(1) An owner or custodian shall not allow his or her animal to go at large.

(2) If a dog injures a person while at large, lack of knowledge of the dog's vicious propensity standing alone shall not absolve the owner from a finding of negligence.

(b) A person shall not knowingly and falsely deny ownership or custodianship of an animal.

(c)(1) An owner or custodian shall not leave his or her animal outdoors without human accompaniment or adequate shelter for more than 15 minutes during periods of extreme weather, unless the age, condition, and type of each animal allows the animal to withstand extreme weather.

(2) Paragraph (1) of this subsection shall not apply to cats.

(d) A person shall not remove the license of a dog without the permission of its owner.

(e) A dog shall not be permitted on any school ground or on any public recreation area, other than a dog park, unless the dog is on a leash, tether, or otherwise under adequate means of control of a person capable of physically restraining it.

(f)(1) A person shall not separate a puppy or a kitten from its mother until the puppy or kitten is at least 6 weeks of age.

(2) Paragraph (1) of this subsection shall not apply in cases where a mother poses a danger to its offspring.

(g) A person shall not give, sell, or offer for sale a puppy or kitten under 6 weeks of age, unless the puppy's or kitten's mother is given or sold to the same person as the

<https://code.dccouncil.us/dc/council/code/sections/8-1808.html>[04/16/2018 2:05:39 PM]

puppy or kitten.

(h)(1) A person shall not change the natural color of a baby chicken, duckling, other fowl, or rabbit.

(2) A person shall not sell or offer for sale a baby chicken, duckling, other fowl, or rabbit that has had its natural color changed.

(i) A person shall not sell or offer for sale a rabbit under the age of 16 weeks or a chick or duck under the age of 8 weeks except for agricultural or scientific purposes.

(j)(1) Except as provided in this subsection, a person shall not import into the District, possess, display, offer for sale, trade, barter, exchange, or adoption, or give as a household pet, any living member of the animal kingdom, including those born or raised in captivity, except the following:

(A) Domestic dogs, excluding hybrids with wolves, coyotes, or jackals;

(B) Domestic cats, excluding hybrids with ocelots or margays;

(C) Domesticated rodents and rabbits;

(D) Captive-bred species of common cage birds;

(E) Non-venomous snakes, fish, and turtles, traditionally kept in the home for pleasure rather than for commercial purposes;

(F) Ferrets; and

(G) Racing pigeons, when kept in compliance with permit requirements.

(2) A person may offer any of the species enumerated in paragraph (1) of this subsection to a public zoo, park, or museum for exhibition purposes.

(3) This section shall not apply to federally licensed animal exhibitors; provided, that the Mayor shall retain the authority to restrict the movement of any prohibited animal into the District and the conditions under which those movements are made.

(4) The Mayor may allow a licensed wildlife rehabilitator, licensed veterinarian, or licensed animal shelter to maintain an animal prohibited in this subsection for treatment or pending appropriate disposition.

(k)(1) A person shall not sponsor, promote, train an animal to participate in,

contribute to the involvement of an animal in, or attend as a spectator, any activity or event in which any animal engages in unnatural behavior, is wrestled or fought, mentally or physically harassed, or displayed in such a way that the animal is struck, abused, or mentally or physically stressed or traumatized, or is induced, goaded, or encouraged to perform or react through the use of chemical, mechanical, electrical, or manual devices, in a manner that will cause, or is likely to cause, physical or other injury or suffering.

(2) The prohibitions set forth in paragraph (1) of this subsection shall apply to any event or activity at a public or private facility or property, and are applicable regardless of the purpose of the event or activity and whether a fee is charged to spectators of the event or activity.

(l)(1) An owner or custodian of a dog shall not direct, encourage, cause, allow, aid, or assist that dog to threaten, charge, bite, or attack a person or other animal, except that an owner or custodian may keep a properly trained dog on private property to defend the property and its occupants from intruders, and may order a dog to defend a person under attack.

(2) Paragraph (1) of this subsection shall not apply to dogs that work for the Metropolitan Police Department or any other law enforcement agency.

(m) A person shall not display, exhibit, or otherwise move animals in the District as part of a circus, carnival, or other special performance or event, without first obtaining a permit, issued by the Mayor, that governs the care and management of the animals.

(n) An owner or custodian shall not neglect to provide his or her animal with adequate care, adequate feed, adequate shelter, adequate space, and adequate water.

(o) A person shall not take actions that intentionally harm, or that the person should know are likely to cause harm to, an animal.

(p)(1) An owner or custodian shall not abandon an animal in his or her possession.

(2) An owner who transfers ownership of an animal or releases the animal to the Animal Care and Control Agency shall not be liable for abandonment.

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## Article

# Environmental Impact and Relative Invasiveness of Free-Roaming Domestic Carnivores—a North American Survey of Governmental Agencies

Ana Lepe <sup>1</sup>, Valerie Kaplan <sup>1</sup>, Alirio Arreaza <sup>1</sup>, Robert Szpanderfer <sup>1</sup>, David Bristol <sup>2</sup> and M. Scott Sinclair <sup>1,\*</sup>

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Received: 21 August 2017; Accepted: 9 October 2017; Published: 14 October 2017

**Simple Summary:** This paper reports on a survey that explores the impact of three non-native domestic carnivores—dogs, cats, and ferrets—on the native wildlife of the United States (US) and Canada. Government agencies were asked to document the number and frequency of sightings, and the degree of concern resulting from free-roaming animals on urban, suburban, rural, recreational areas, and wildlands in their jurisdictions. Results confirm the existence of free-roaming cats and dogs throughout North America, as well as their profound impact on native wildlife, with cats being the major offenders. Except for an occasional stray, free-roaming ferrets were “never” or “rarely seen”; no agency reported that ferrets caused environmental harm. This is the first study to compare the relative impact of free-roaming dogs, cats, and ferrets. It shows differences in how these three animals react to novel environments. For the US and Canada, free roaming cats and dogs meet the definition of an “invasive” species, whereas ferrets do not. However, the way we as a society view these animals, our attitudes and perceptions, may influence how governmental agencies manage and control them.

**Abstract:** A survey of the United States and Canadian governmental agencies investigated the environmental impact and relative invasiveness of free-roaming domestic non-native carnivores—dogs, cats, and ferrets. Agencies represented wildlife, fish, game, natural or environmental resources, parks and recreation, veterinary and human health, animal control, and agriculture. Respondents were asked to document the number and frequency of sightings of unconfined animals, evidence for environmental harm, and the resulting “degree of concern” in their respective jurisdictions. Results confirmed the existence of feral (breeding) cats and dogs, documenting high levels of concern regarding the impact of these animals on both continental and surrounding insular habitats. Except for occasional strays, no free-roaming or feral ferrets were reported; nor were there reports of ferrets impacting native wildlife, including ground-nesting birds, or sensitive species. This is the first study to report the relative impact of free-roaming domestic carnivores. Dogs and cats meet the current definition of “invasive” species, whereas ferrets do not. Differences in how each species impacts the North American environment highlights the complex interaction between non-native species and their environment. Public attitudes and perceptions regarding these species may be a factor in their control and agency management priorities.

**Keywords:** cat; dog; domestic carnivore; ferret; environmental impact; government; invasive; non-native species; North America; survey



## 1. Introduction

Concern over the impact of non-native species on novel ecosystems has been a major focus of both conservationists and governmental agencies world-wide, which has resulted in the mandated monitoring and management of non-native species [1]. Historically, humans migrating to new geographic locations brought their animals and plants with them, resulting in large-scale introductions of non-native species to novel ecosystems. These activities created both competition with and, in many cases, destruction of, native species and habitats. Concepts of “nativeness” and “alien” species did not arise, however, until the 19th century, later engendering a global discussion of “biologic invasions” exemplified by Charles Elton’s 1958 treatise, *The Ecology of Invasion by Animals and Plants* [2,3]. Currently an “invasive” species is defined as “any species not native to the ecosystem likely to cause economic or environmental harm, or harms human health” [4]. Today, Canada and the United States are among the nations to develop positions regarding “invasive” species, along with mandates to control them [4,5].

With the exception of the Alaskan malamute, the domestic carnivores—the dog (*Canis lupus familiaris*), cat (*Felis silvestris catus*), and ferret (*Mustela putorius furo*)—each meet the definition of “nonnative” species [6–11]. The ferret (also “European” ferret) should not be confused with the wild black-footed ferret (*Mustela nigripes*), one of North America’s most endangered mammals [12].

In 1993, a US Congressional report “*Harmful Non-Indigenous Species in the United States*” named feral dogs and cats as “two of the three most common subjects of wildlife control efforts” of US national parks and wildlife reserves; the ferret was not mentioned [13]. In the US alone, cats reportedly kill 1.3–4.0 billion birds and 6.3–22.3 billion mammals annually, resulting in economic damages around \$14 billion (USD) [14–24]. All 50 states report the existence of feral dogs, with resultant damage to both natural and agricultural resources estimated at more than \$620 million annually [21,22,25]. In a 10-year review by Bergman et al., the impact from feral dogs was seen not only in their predation, but also in their causing behavioral changes in both wildlife and livestock, and their role in disease transmission to other animals and to humans [25].

Although it is legal to own a dog or cat throughout the North American continent and the surrounding islands, some jurisdictions prohibit ferrets. These include the states of Hawaii and California, and certain cities [26–29]. As a basis for restricting the ferret, government agencies cite reports from New Zealand and other island nations where European settlers released thousands of ferrets, cats, and other domestic species in the late 19th century resulting in a disruption of local ecosystems [30,31]. In response to a Citizen Petition to California regarding its ban on ferrets, a nation-wide survey was conducted in 1996–1997 by the California Department of Fish and Game Habitat Conservation and Planning Branch. Although state agencies reported urban sightings of “stray” ferrets as “none” (15–30%), or “rare or “sporadic” (28–56%), and no state suspected or documented “breeding” (feral) ferrets, California continued its ban on domestic ferrets [32].

SeaSearch Biological Surveys (SeaSearch), became interested in the discrepancy in regulatory response. Therefore, the purpose of this study was to examine the evidence for invasiveness from the three domestic carnivores using a survey to assess their relative levels of impact on the North American environment and agriculture. The survey was designed to document the existence of free-roaming (“unconfined”) animals—those outside of the direct control of humans, and the evidence for “harm” caused to native wildlife and agricultural species. It also elicited the “degree of concern” generated by the presence and impact of these three animals when in the unconfined state. This article focuses on the impact to native wildlife and the environment, including parks and recreational areas. The impact on agriculture is being reported separately.

## 2. Materials and Methods

State agencies of the US (including Washington, DC) and provincial agencies of Canada were selected that had roles in the control, management, or impact of domestic or wild animals. Agencies represented natural or environmental resources, fish, game and wildlife, agriculture, parks and recreational areas, and human and veterinary health departments (e.g., “State Veterinarian”), where such a department or

position existed. Due to California's statewide ban on ferrets, both the state and county agencies were queried. County agencies represented parks and recreation, health, agriculture, and animal control.

The survey was disseminated in the form of a questionnaire (see Supplementary Materials Figure S1). It addressed agency and responder demographics; terminology used by the agencies to classify dogs, cats and ferrets (e.g., "house-pet/companion", "domestic/domesticated", "exotic", "wild"—"wildlife", etc.); "sightings" and "existence" of unconfined animals; "frequency of unconfined animal sightings" and estimates of "number of animals" at each sighting; "effects (impact)" on wildlife, parks-recreational areas, and agriculture; and, "actions taken" (e.g., "none", "live trap", "refer to another agency", etc.). Rating systems varied depending on the question. Responses requiring estimates were presented in a discrete ratings system to reduce open-ended responses and decrease the response variability. Each question included a "comments" section to allow for clarification or documentation of the ratings given. Respondents were also asked to rank their "degree of concern" and to provide any "special concerns" regarding unconfined animals in urban, rural-agriculture, parks-recreational, and wildlands-undeveloped settings.

Initial agency contacts were identified using the Internet. When no comparable agency was found, the highest jurisdictional level was contacted by telephone in an attempt to identify the responsible organizational unit or individual. Using a script, potential respondents were then contacted by telephone to invite their participation.

In the initial telephone calls, participants were asked how they wished to receive the survey. Based on their requests, the survey was distributed to agencies in electronic format (.pdf—Adobe Acrobat®), by facsimile, or mailed in "hard-copy". Delivery, receipt, and correspondence were tracked and recorded. Completed surveys and correspondence were saved in or converted to electronic media. At least six attempts were made to reach non-responding jurisdictions, and results of these efforts were recorded. Data collection included both coded ratings and text. All data were periodically updated and maintained in a database (Microsoft Access®). Analyses were performed on individual agency categories, and in combination with other agency categories.

Responses were categorized as a "completed survey" (S) or a "nonsurvey response" (NS), when some information responsive to the questionnaire was provided. Failure or refusal to respond in the absence of any responsive information was recorded as a "nonresponse" (NR). For NRs, the next organizational level was contacted to determine whether another individual or organizational unit would be more appropriate. Results reported herein reflect all responding state or provincial agencies, with a separate set of analyses performed on the combined CA county agencies.

The Mann-Whitney test was used to compare responses for dogs, cats, and ferrets, with respect to frequency of sightings (0 = "Never", 1 = "Historical", 2 = "Rare", 3 = "Common", or 4 = "Frequent"), degree of concern regarding sightings (−2 = "Definite Concern", −1 = "Some Concern", 0 = "No Concern", 1 = "Some Benefit", or 2 = "Definite Benefit"), and the number of animals per sighting. Means and standard error of the mean (sem) are presented for each comparison. Pairwise comparisons are designated as 'a': dogs vs. cats, 'b': ferrets vs. dogs, and 'c': ferrets vs. cats. *p*-values between 0.0001 and 0.001 are presented as "*p* < 0.001", *p*-values between 0.001 and 0.01 are presented as "*p* < 0.01", *p*-values between 0.01 and 0.05 are presented as "*p* < 0.05", and *p*-values exceeding 0.05 presented as "ns".

### 3. Results

Responses were received from 96.7% (59 of 61) jurisdictions at the state/provincial level, representing 108 agencies (85 S; 23 NS). The majority of responding agencies (S + NS) were wildlife, fish, game, natural or environmental resources (58; 53.7%), with the remaining from parks and recreation (13; 12.0%), State Veterinarian (15; 13.9%), health (12; 11.1%), and agriculture (10; 9.3%). Included among the NS were those claiming "no data" (10.3%), or that they were not the "correct" agency but gave referrals to other agencies (8.3%). One hundred sixty-four agencies were NRs; no agency responded from Arizona and Kansas. When reasons were given, NRs stated that they did not wish to participate, lacked the funding or time to participate, or refused to participate unless they knew more about the surveyor.



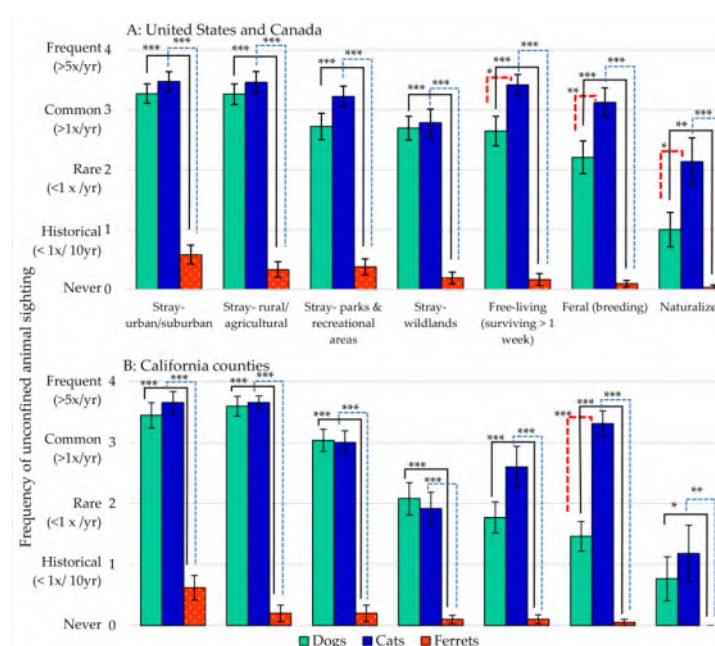
Demographics showed that respondents represented a wide range of organizational levels and expertise. Of the 69 US agencies providing sufficient organizational information, 29.0% were agency or department heads (level 1), 30.4% were supervisors (level 2), and 40.6% had no supervisory responsibility (level 3). Of the 10 Canadian provincial agency responders, 18.2% were level 1, 18.2% level 2, and 63.6% level 3.

Thirty-five (60.34%) of California's 58 counties responded. Not all counties had agencies comparable to those at the state level, and no county agency represented wildlife, fish, game, natural, or environmental resources. Instead of a veterinary unit, most counties had an animal control division. Forty-five county agencies responded (S + NS): 36 S (80.0%) and 9 NS (20.0%). Of responders (S + NS), 23 (51.1%) were animal control, 6 (13.3%) parks (beaches)-recreation, 12 (26.7%) agriculture, and 4 (8.9%) health departments. One hundred forty-eight county agencies were NR, which either failed or refused to respond or provided no information responsive to the survey. Of the 31 counties completing the demographics section, 38.7% were level 1 individuals, 41.9% level 2, and 19.3% level 3.

### 3.1. Sightings of Unconfined Animals

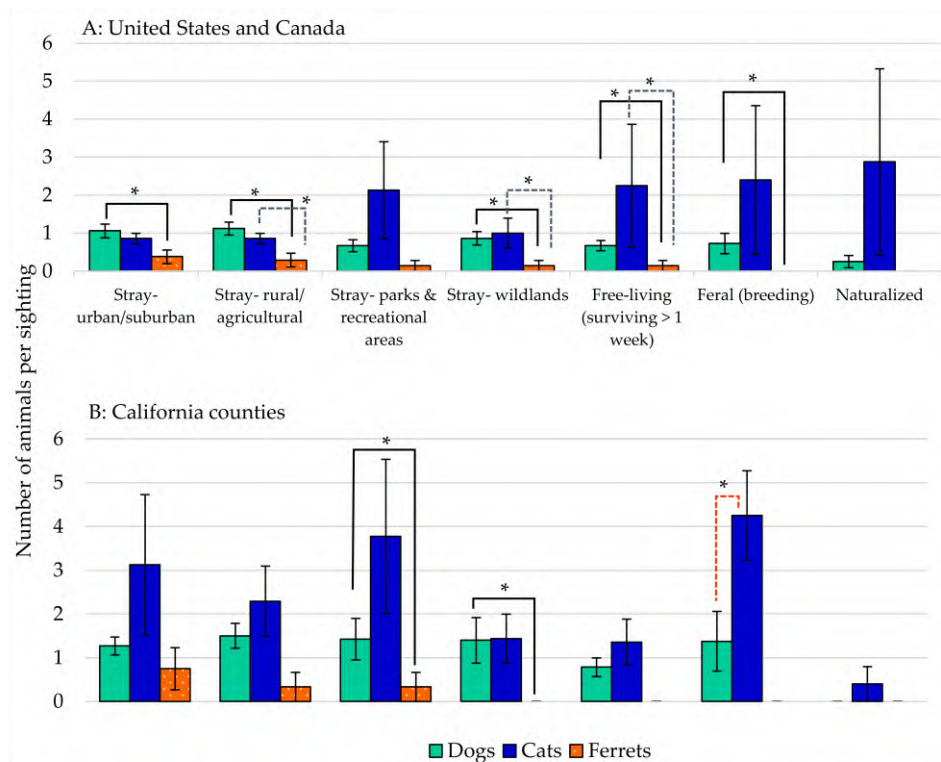
Respondents were asked to estimate the "frequency of sighting" of unconfined dogs, cats, and ferrets, the number of animals seen at each sighting, and "degree of concern" regarding unconfined animals in the following areas: urban-suburban; rural-agricultural; parks-recreational areas; wildlands; and, the existence of "free-living (surviving > 1 week)", "feral (breeding)", or "naturalized" animals.

The "frequency of sightings" of an unconfined dog, cat, or ferret was reported covering specified time periods (Figure 1). In most areas, sightings of "stray" dogs and cats were rated "common (>1 time per year)", whereas ferret sightings were rated as either "historical" ("not in the past 10 years") or "never". Unconfined cats were sighted more frequently than dogs in most locations; however, both species had ratings for "commonly seen (>1 time per year)", "free-living", "feral", or "naturalized" animals. Similar results were reported from responding California county agencies. Unconfined cats the most frequently observed animal, except for a slight majority of dogs spotted in parks and recreational areas, and in wildlands. No county agency reported "free-living", "feral", or "naturalized" ferrets.



**Figure 1.** Frequency of sighting for unconfined dogs, cats, and ferrets for: (A) United States, and Canada (B) California counties. Rating mean  $\pm$  standard error of the mean (sem). Asterisk represents significant difference; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

For “average numbers of unconfined animals” reported at each sighting (Figure 2, Table 1), dogs were most often sighted as single animals, whereas cats were seen in groups of three or more, with increasing numbers of cats observed as “free-living”, “feral (breeding)”, and “naturalized” animals. In “urban-suburban” and rural-agricultural settings, state and provincial agencies reported dogs and cats in equal numbers, whereas the California county agencies observed increased numbers of cats in these areas. For most other areas, cats were seen in greater numbers than dogs, and large numbers of feral cats were observed by all of the agencies. Except for occasional strays in areas of human activity, no California agency reported ferrets as “naturalized”, “feral (breeding)”, or “free-living”.



**Figure 2.** Average number of animals per sighting of (A) United States, Canada, and (B) California counties. Rating mean  $\pm$  standard error of the mean (sem). Asterisk represents significant difference; \*  $p < 0.05$ .

**Table 1.** Number of animals per sighting.

| Animal Sightings                 | Dogs        | Cats         | Ferrets     | <i>p</i> -Value                                   |
|----------------------------------|-------------|--------------|-------------|---------------------------------------------------|
|                                  | Mean ± sem  | Mean ± sem   | Mean ± sem  |                                                   |
| United States and Canada         |             |              |             |                                                   |
| Stray—urban/suburban             | 1.06 ± 0.18 | 0.86 ± 0.14  | 0.38 ± 0.18 | <sup>ac</sup> ns<br><sup>b</sup> <i>p</i> < 0.05  |
| Stray—rural/agricultural         | 1.12 ± 0.17 | 0.86 ± 0.14  | 0.29 ± 0.18 | <sup>a</sup> ns<br><sup>bc</sup> <i>p</i> < 0.05  |
| Stray—parks & recreational areas | 0.67 ± 0.16 | 2.13 ± 1.28  | 0.14 ± 0.14 | <sup>abc</sup> ns<br><sup>a</sup> ns              |
| Stray—wildlands                  | 0.86 ± 0.18 | 1.00 ± 0.39  | 0.14 ± 0.14 | <sup>bc</sup> <i>p</i> < 0.05<br><sup>a</sup> ns  |
| Free-living (surviving > 1 week) | 0.67 ± 0.14 | 2.25 ± 1.62  | 0.14 ± 0.14 | <sup>bc</sup> <i>p</i> < 0.05<br><sup>ac</sup> ns |
| Feral (breeding)                 | 0.73 ± 0.27 | 2.40 ± 1.96  | 0.00 ± 0.00 | <sup>b</sup> <i>p</i> < 0.05<br><sup>abc</sup> ns |
| Naturalized                      | 0.25 ± 0.16 | 2.88 ± 0.245 | 0.00 ± 0.00 |                                                   |

Table 1. Cont.

| Animal Sightings                         | Dogs        | Cats        | Ferrets     | <i>p</i> -Value               |
|------------------------------------------|-------------|-------------|-------------|-------------------------------|
|                                          | Mean ± sem  | Mean ± sem  | Mean ± sem  |                               |
| California Counties                      |             |             |             |                               |
| Stray Animals—urban/suburban             | 1.27 ± 0.20 | 3.13 ± 1.60 | 0.75 ± 0.48 | abc ns                        |
| Stray Animals—rural/agricultural         | 1.50 ± 0.29 | 2.29 ± 0.80 | 0.33 ± 0.33 | abc ns                        |
| Stray animals—parks & recreational areas | 1.42 ± 0.47 | 3.77 ± 1.76 | 0.33 ± 0.33 | ac ns                         |
|                                          |             |             |             | <sup>b</sup> <i>p</i> < 0.05  |
| Stray Animals—wildlands                  | 1.40 ± 0.52 | 1.44 ± 0.56 | 0.00 ± 0.00 | <sup>ac</sup> ns              |
| Free-living animals (surviving > 1 week) | 0.79 ± 0.21 | 1.36 ± 0.52 | 0.00 ± 0.00 | <sup>b</sup> <i>p</i> < 0.05  |
|                                          |             |             |             | abc ns                        |
| Feral (Breeding) Animals                 | 1.38 ± 0.68 | 4.25 ± 1.03 | 0.00 ± 0.00 | <sup>ac</sup> <i>p</i> < 0.05 |
| Naturalized animals                      | 0.00 ± 0.00 | 0.40 ± 0.40 | 0.00 ± 0.00 | <sup>b</sup> ns               |
|                                          |             |             |             | <sup>ac</sup> ns              |

Statistical comparisons: <sup>a</sup> dogs vs.cats, <sup>b</sup> ferrets vs. dogs, <sup>c</sup> ferrets vs. cats; sem: standard error of the mean; ns: nonsignificant.

### 3.2. Sighting of Unconfined Animals—"Degree of Concern"

Respondents were asked to rank their "degree of concern" regarding the existence of unconfined dogs, cats, and ferrets. Ratings were quantified as follows: "definite concern" (−2), "some concern" (−1), "no concern" (0), "some benefit" (+1), or "definite benefit" (+2). For state and provincial agencies, cats and dogs engendered "some concern" to "definite concern" (Table 2). Feral cats were ranked the highest "degree of concern" (−1.83). Overall, unconfined cats ranked higher than dogs, with ferrets given the lowest level of concern (Overall Means: cats: −1.73; dogs: −1.47; ferrets: −0.56).

Ratings from the California county agencies were somewhat lower than those given by states and provinces (Overall Means: cats: −1.23; dogs: −1.21; ferrets: −0.43). The greatest "degree of concern" was from unconfined dogs in recreational (−1.74) and agricultural (−1.69) areas, and from unconfined stray cats in urban-suburban (−1.58) and in agricultural areas (−1.44), and in the feral state (−1.44). County agencies, which ranked ferrets lowest overall, most notably had the least concerns over "feral" (−0.36), or "naturalized" (−0.22) ferrets, which conformed to agencies' lack of sightings or reports of ferrets existing in these states.

### 3.3. Impact: Existence of Incidents on Wildlife from Unconfined Animals and Degree of Concern

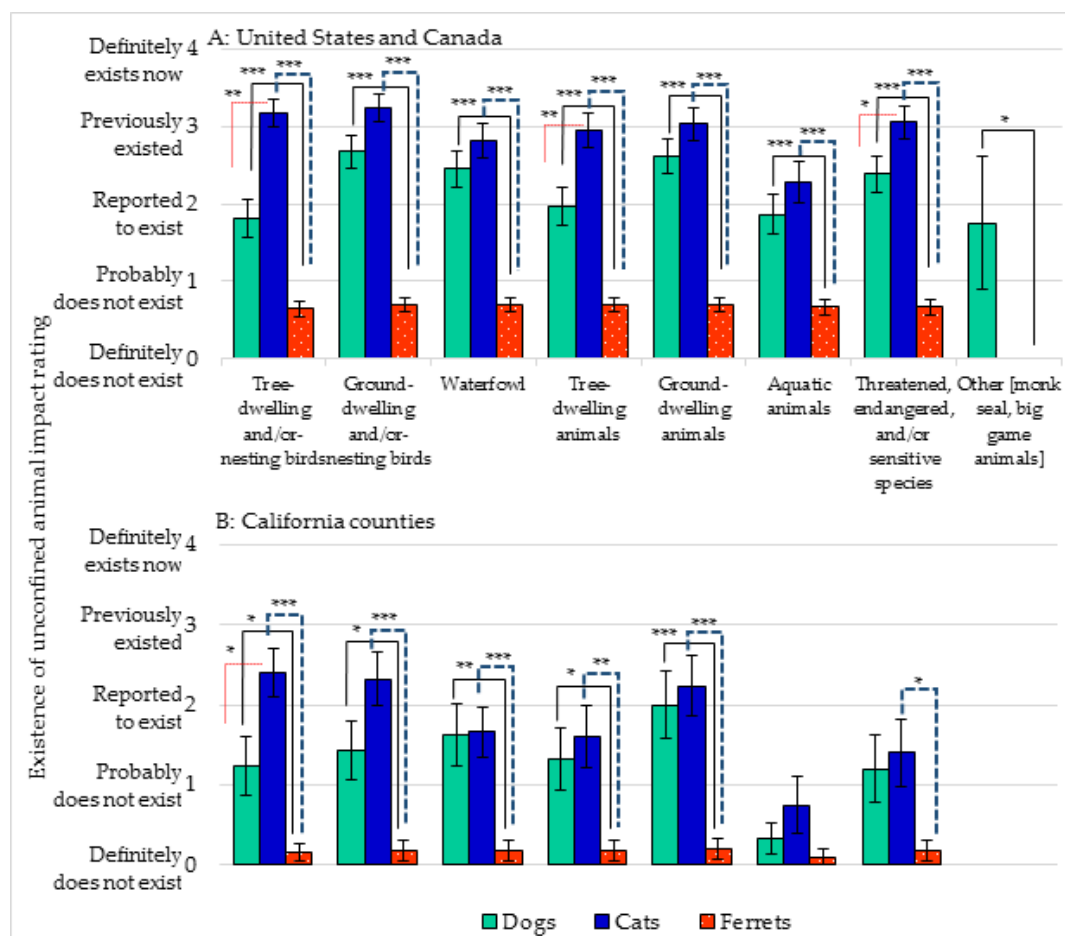
Respondents were also asked to identify the existence of incidents, or impact, from unconfined domestic carnivores on native wildlife (Figure 3; see also Supplementary Materials Table S1). State and provincial agencies ranked incidents from unconfined dogs and cats as "reported to exist" or "previously existed" regarding "tree-dwelling and/or nesting birds", "ground-dwelling and/or nesting birds", "waterfowl", "tree-dwelling" animals, "ground-dwelling" animals, "aquatic animals", "threatened, endangered and/or sensitive species", with Hawaii listing dogs as aggravating "monk" seals. With the exception of the "monk" seal (Hawaii) and "big game" animals, cats received the highest levels of incidents, representing the greatest negative impact on wildlife for all categories (cats: 2.53; dogs: 2.19). In contrast, ferrets ranged from "probably does not exist" to "definitely does not exist" (ferrets: 0.59). Results from the California county agencies followed a similar pattern, with ferret-related incidents ranked the lowest (cats: 1.55; dogs: 1.15; ferrets: 0.15).

State and provincial agencies ranked "degree of concern" highest for cats for their impact on "tree-dwelling" and "ground dwelling" birds, with the exception of Hawaii, which ranked dogs as a "definite concern" with respect to the "monk" seal ("other") (Table 3). The California county agencies also ranked cats the highest with regard to the "degree of concern", although they expressed at least "some concern" for all three species when unconfined with regard to "threatened, endangered and/or sensitive species".

**Table 2.** “Degree of concern” regarding sightings of unconfined dogs, cats, ferrets.

| Animal Sightings                 | Dogs         |                           | Cats         |              | Ferrets      |              | <i>p</i> -Value                                                                 |
|----------------------------------|--------------|---------------------------|--------------|--------------|--------------|--------------|---------------------------------------------------------------------------------|
|                                  | Mean ± sem   | <sup>1</sup> Rating Range | Mean ± sem   | Rating Range | Mean ± sem   | Rating Range |                                                                                 |
| United States, DC and Canada     |              |                           |              |              |              |              |                                                                                 |
| Stray-urban/suburban             | −1.58 ± 0.09 | (−2)–0                    | −1.76 ± 0.08 | (−2)–0       | −0.50 ± 0.12 | (−2)–0       | <sup>a</sup> ns<br>bc <i>p</i> < 0.001                                          |
| Stray-rural/ agricultural        | −1.61 ± 0.09 | (−2)–0                    | −1.72 ± 0.09 | (−2)–1       | −0.54 ± 0.14 | (−2)–1       | <sup>a</sup> ns<br>bc <i>p</i> < 0.001                                          |
| Stray-parks & recreational areas | −1.57 ± 0.08 | (−2)–0                    | −1.70 ± 0.09 | (−2)–1       | −0.56 ± 0.13 | (−2)–0       | <sup>a</sup> ns<br>bc <i>p</i> < 0.001                                          |
| Stray-wildlands                  | −1.49 ± 0.10 | (−2)–0                    | −1.70 ± 0.07 | (−2)–(−1)    | −0.58 ± 0.14 | (−2)–0       | <sup>a</sup> ns<br>bc <i>p</i> < 0.001                                          |
| Free-living (surviving > 1 week) | −1.50 ± 0.10 | (−2)–0                    | −1.76 ± 0.08 | (−2)–0       | −0.54 ± 0.13 | (−2)–0       | <sup>a</sup> ns<br>bc <i>p</i> < 0.001                                          |
| Feral (Breeding)                 | −1.53 ± 0.10 | (−2)–0                    | −1.83 ± 0.06 | (−2)–(−1)    | −0.54 ± 0.13 | (−2)–0       | <sup>a</sup> <i>p</i> < 0.05<br>bc <i>p</i> < 0.001                             |
| Naturalized                      | −1.03 ± 0.18 | (−2)–2                    | −1.61 ± 0.13 | (−2)–0       | −0.65 ± 0.15 | (−2)–0       | <sup>a</sup> <i>p</i> < 0.05<br><sup>b</sup> ns                                 |
| Overall Means                    | −1.47        |                           | −1.73        |              | −0.56        |              | <sup>c</sup> <i>p</i> < 0.001                                                   |
| California Counties              |              |                           |              |              |              |              |                                                                                 |
| Stray-urban/suburban             | −1.00 ± 0.19 | (−2)–0                    | −1.58 ± 0.16 | (−2)–1       | −0.47 ± 0.19 | (−2)–0       | <sup>a</sup> ns<br>bc <i>p</i> < 0.001                                          |
| Stray-rural/agricultural         | −1.74 ± 0.11 | (−2)–0                    | −1.44 ± 0.20 | (−2)–2       | −0.47 ± 0.19 | (−2)–0       | <sup>a</sup> ns<br>bc <i>p</i> < 0.001                                          |
| Stray-parks & recreational areas | −1.69 ± 0.13 | (−2)–0                    | −1.36 ± 0.16 | (−2)–1       | −0.50 ± 0.20 | (−2)–0       | <sup>a</sup> ns<br>bc <i>p</i> < 0.001<br><sup>c</sup> <i>p</i> < 0.01          |
| Stray-wildlands                  | −1.28 ± 0.16 | (−2)–0                    | −1.08 ± 0.19 | (−2)–1       | −0.46 ± 0.22 | (−2)–0       | <sup>a</sup> ns<br><sup>b</sup> <i>p</i> < 0.01<br><sup>c</sup> <i>p</i> < 0.05 |
| Free-living (surviving > 1 week) | −1.16 ± 0.18 | (−2)–0                    | −1.19 ± 0.20 | (−2)–1       | −0.50 ± 0.23 | (−2)–0       | <sup>a</sup> ns<br>bc <i>p</i> < 0.05                                           |
| Feral (Breeding)                 | −1.29 ± 0.18 | (−2)–0                    | −1.44 ± 0.20 | (−2)–1       | −0.36 ± 0.20 | (−2)–0       | <sup>a</sup> ns<br>bc <i>p</i> < 0.01                                           |
| Naturalized                      | −0.33 ± 0.26 | (−2)–1                    | −0.50 ± 0.25 | (−2)–1       | −0.22 ± 0.22 | (−2)–0       | <sup>a</sup> ns<br>abc ns                                                       |
| Overall Means                    | −1.21        |                           | −1.23        |              | −0.43        |              |                                                                                 |

<sup>1</sup> Rating scale: “definite concern”: −2, “some concern”: −1, “no concern”: 0, “some benefit”: +1, “definite benefit”: +2; Statistical comparisons: <sup>a</sup> dogs vs. cats, <sup>b</sup> ferrets vs. dogs, <sup>c</sup> ferrets vs. cats; sem: standard error of the mean; ns: nonsignificant.

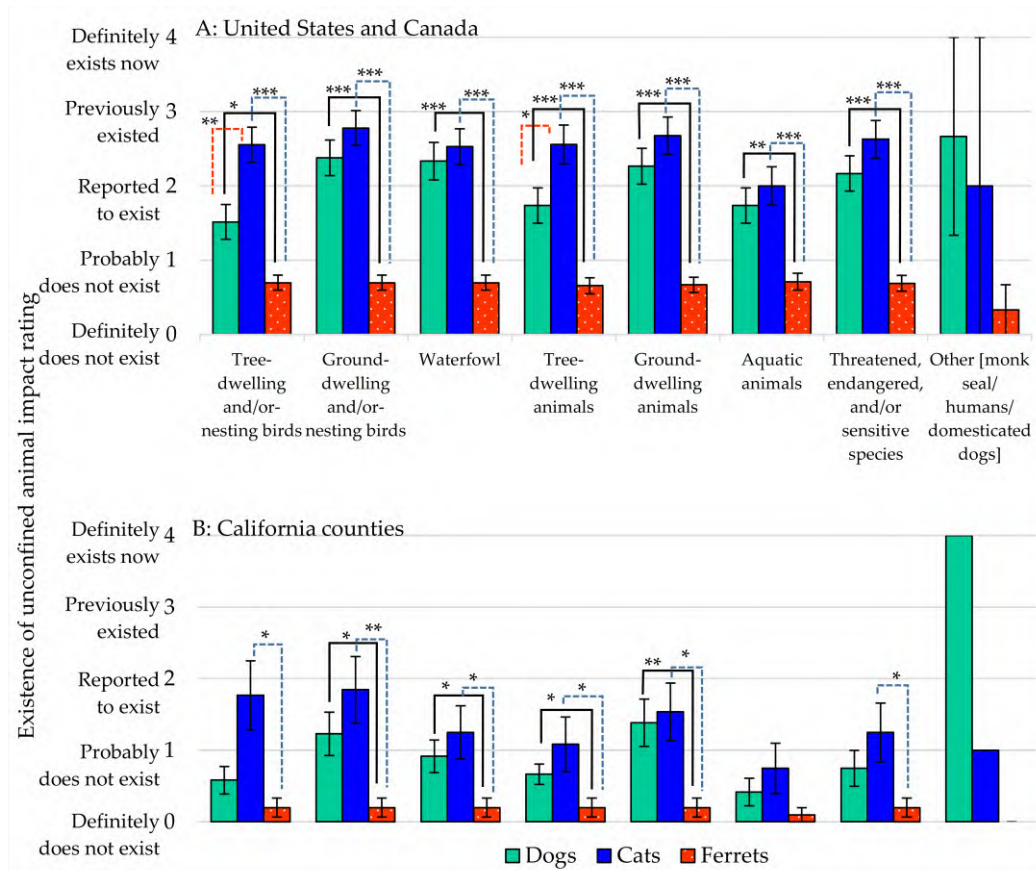


**Figure 3.** “Existence” of incidents (impact) on wildlife from unconfined dogs, cats, ferrets (A) United States, Canada, and (B) California counties. Rating mean  $\pm$  standard error of the mean (sem). Asterisk represents significant difference; \*  $p < 0.05$ , \*\*  $p < 0.01$ , and \*\*\*  $p < 0.001$ .

### 3.4. Impact: Existence of Incidents on Wildlife in Parks—Recreational Areas from Unconfined Animals and Degree of Concern

Impact ratings on the wildlife in parks and recreational areas followed a pattern similar to the other environmental regions (Figure 4; see also Supplementary Materials Table S2). Cats featured more prominently than dogs in all of the wildlife categories for state and provincial agencies, as well as the California county agencies, with the exception of “other” animals. Dogs were listed as having a greater impact on the “monk” seal and “big game”. Interestingly, under “other”, the California counties noted that both cats, dogs (“on leashes”) and humans as having impact in recreational areas.

State and provincial agencies also ranked “degree of concern” highest for cats for their impact on “tree-dwelling” and “ground dwelling” birds, with the exception of Hawaii, which ranked dogs as a “definite concern” with respect to the “monk” seal (“other”). Similarly, the California county agencies ranked cats the highest with regard to “degree of concern”, although they expressed at least “some concern” for all three species when unconfined with regard to “threatened, endangered and/or sensitive species” (Table 4).



**Figure 4.** “Existence” of incidents (impact) on wildlife in parks and recreational areas from unconfined dogs, cats, ferrets (A) United States, Canada, and (B) California counties. Rating mean  $\pm$  standard error of the mean (sem). Asterisk represents significant difference; \*  $p < 0.05$ , \*\*  $p < 0.01$ , and \*\*\*  $p < 0.001$ .



**Table 3.** “Degree of concern” regarding the effects (impact) of unconfined animal on wildlife.

| Effects on Wildlife                              | Dogs         |                           | Cats         |              | Ferrets      |              | <i>p</i> -Value                                                |
|--------------------------------------------------|--------------|---------------------------|--------------|--------------|--------------|--------------|----------------------------------------------------------------|
|                                                  | Mean ± sem   | <sup>1</sup> Rating Range | Mean ± sem   | Rating Range | Mean ± sem   | Rating Range |                                                                |
| United States, DC and Canada                     |              |                           |              |              |              |              |                                                                |
| Tree-Dwelling and/or-nesting birds               | −0.68 ± 0.13 | (−2)–0                    | −1.78 ± 0.07 | (−2)–(−1)    | −0.33 ± 0.14 | (−2)–0       | <sup>a</sup> <i>p</i> < 0.001<br><sup>b</sup> ns               |
| Ground-dwelling and/or-nesting birds             | −1.43 ± 0.10 | (−2)–0                    | −1.90 ± 0.05 | (−2)–(−1)    | −0.56 ± 0.18 | (−2)–0       | <sup>abc</sup> <i>p</i> < 0.001                                |
| Waterfowl                                        | −1.09 ± 0.11 | (−2)–0                    | −1.41 ± 0.11 | (−2)–0       | −0.33 ± 0.11 | (−1)–0       | <sup>a</sup> <i>p</i> < 0.05<br><sup>bc</sup> <i>p</i> < 0.001 |
| Tree-dwelling animals                            | −0.75 ± 0.11 | (−2)–0                    | −1.28 ± 0.14 | (−2)–0       | −0.44 ± 0.15 | (−2)–0       | <sup>a</sup> <i>p</i> < 0.01<br><sup>b</sup> ns                |
| Ground-dwelling animals                          | −1.36 ± 0.10 | (−2)–0                    | −1.62 ± 0.09 | (−2)–0       | −0.56 ± 0.18 | (−2)–0       | <sup>c</sup> <i>p</i> < 0.001<br><sup>a</sup> ns               |
| Aquatic animals                                  | −0.54 ± 0.11 | (−2)–0                    | −0.63 ± 0.12 | (−2)–0       | −0.22 ± 0.10 | (−1)–0       | <sup>bc</sup> <i>p</i> < 0.001<br><sup>ab</sup> ns             |
| Threatened, Endangered, and/or Sensitive species | −1.13 ± 0.13 | (−2)–0                    | −1.63 ± 0.13 | (−2)–0       | −0.63 ± 0.21 | (−2)–0       | <sup>c</sup> <i>p</i> < 0.05<br><sup>a</sup> <i>p</i> < 0.01   |
| Other (Monk Seal, Big Game Animals)              | −1.33 ± 0.33 | (−2)–(−1)                 | 0            | 0            | 0            | 0            | <sup>b</sup> <i>p</i> < 0.05<br><sup>c</sup> <i>p</i> < 0.001  |
| Overall Means                                    | −1.04        |                           | −1.28        |              | −0.38        |              | <sup>b</sup> ns                                                |
| California Counties                              |              |                           |              |              |              |              |                                                                |
| Tree-Dwelling and/or—nesting birds               | −0.11 ± 0.35 | (−2)–2                    | −1.64        | (−2)–(−1)    | −0.33        | (−1)–0       | <sup>a</sup> <i>p</i> < 0.001<br><sup>b</sup> ns               |
| Ground-dwelling and/or—nesting birds             | −1.09 ± 0.28 | (−2)–0                    | −1.46 ± 0.18 | (−2)–0       | −0.33 ± 0.33 | (−1)–0       | <sup>c</sup> <i>p</i> < 0.01<br><sup>ab</sup> ns               |
| Waterfowl                                        | −1.09 ± 0.28 | (−2)–0                    | −1.30 ± 0.26 | (−2)–0       | −0.33 ± 0.33 | (−1)–0       | <sup>c</sup> <i>p</i> < 0.05<br><sup>abc</sup> ns              |
| Tree-dwelling animals                            | −0.78 ± 0.32 | (−2)–0                    | −1.25 ± 0.37 | (−2)–0       | −0.33 ± 0.33 | (−1)–0       | <sup>abc</sup> ns                                              |
| Ground-dwelling animals                          | −1.31 ± 0.21 | (−2)–0                    | −1.40 ± 0.22 | (−2)–0       | −0.33 ± 0.33 | (−1)–0       | <sup>abc</sup> ns                                              |
| Aquatic animals                                  | −0.50 ± 0.34 | (−2)–0                    | −0.86 ± 0.34 | (−2)–0       | −0.33 ± 0.33 | (−1)–0       | <sup>abc</sup> ns                                              |
| Threatened, Endangered, and/or Sensitive species | −1.30 ± 0.30 | (−2)–0                    | −1.44 ± 0.29 | (−2)–0       | −0.33 ± 0.33 | (−1)–0       | <sup>abc</sup> ns                                              |
| Other (Monk Seal, Big Game Animals)              | 0            | 0                         | 0            | 0            | 0            | 0            | -                                                              |
| Overall Means                                    | −0.77        |                           | −1.17        |              | −0.29        |              |                                                                |

<sup>1</sup> Rating scale: “definite concern”: −2, “some concern”: −1, “no concern”: 0, “some benefit”: +1, “definite benefit”: +2; Statistical comparisons: <sup>a</sup> dogs vs. cats, <sup>b</sup> ferrets vs. dogs, <sup>c</sup> ferrets vs. cats; sem: standard error of the mean; ns: nonsignificant.

**Table 4.** “Degree of concern” regarding the effects (impact) of unconfined animal on wildlife in parks and recreational areas.

| Effects on Parks/Recreational Areas              | Dogs         |                           | Cats         |              | Ferrets      |              | <i>p</i> -Value                                                  |
|--------------------------------------------------|--------------|---------------------------|--------------|--------------|--------------|--------------|------------------------------------------------------------------|
|                                                  | Mean ± sem   | <sup>1</sup> Rating Range | Mean ± sem   | Rating Range | Mean ± sem   | Rating Range |                                                                  |
| United States, DC and Canada                     |              |                           |              |              |              |              |                                                                  |
| Tree-Dwelling and/or-nesting birds               | −0.54 ± 0.12 | (−2)–0                    | −1.35 ± 0.16 | (−2)–0       | −0.64 ± 0.17 | (−2)–0       | <sup>a</sup> <i>p</i> < 0.001<br><sup>b</sup> ns                 |
| Ground-dwelling and/or-nesting birds             | −1.25 ± 0.14 | (−2)–0                    | −1.57 ± 0.13 | (−2)–0       | −0.36 ± 0.20 | (−2)–0       | <sup>c</sup> <i>p</i> < 0.01<br><sup>a</sup> ns                  |
| Waterfowl                                        | −0.96 ± 0.14 | (−2)–0                    | −1.15 ± 0.15 | (−2)–0       | −0.07 ± 0.07 | (−1)–0       | <sup>bc</sup> <i>p</i> < 0.001<br><sup>a</sup> ns                |
| Tree-dwelling animals                            | −0.43 ± 0.12 | (−2)–0                    | −1.20 ± 0.15 | (−2)–0       | −0.23 ± 0.17 | (−2)–0       | <sup>bc</sup> <i>p</i> < 0.001<br><sup>ac</sup> <i>p</i> < 0.001 |
| Ground-dwelling animals                          | −1.19 ± 0.12 | (−2)–0                    | −1.42 ± 0.14 | (−2)–0       | −0.29 ± 0.16 | (−2)–0       | <sup>b</sup> ns<br><sup>a</sup> ns                               |
| Aquatic animals                                  | −0.45 ± 0.14 | (−2)–0                    | −0.45 ± 0.14 | (−2)–0       | −0.13 ± 0.09 | (−1)–0       | <sup>bc</sup> <i>p</i> < 0.001<br><sup>abc</sup> ns              |
| Threatened, Endangered, and/or Sensitive species | −1.12 ± 0.17 | (−2)–0                    | −1.44 ± 0.16 | (−2)–0       | −0.43 ± 0.20 | (−2)–0       | <sup>a</sup> ns<br><sup>b</sup> <i>p</i> < 0.05                  |
| Other (monk seal/humans/domesticated dogs)       | −2.00        | −2                        | -            | -            | -            | -            | <sup>c</sup> <i>p</i> < 0.01<br>-                                |
| Overall Mean:                                    | −0.99        |                           | −1.23        |              | −0.31        |              |                                                                  |
| California Counties                              |              |                           |              |              |              |              |                                                                  |
| Tree-Dwelling and/or- nesting birds              | −0.33 ± 0.33 | (−2)–0                    | −1.11 ± 0.31 | (−2)–0       | −0.67 ± 0.67 | (−2)–0       | abc ns                                                           |
| Ground-dwelling and/or- nesting birds            | −0.89 ± 0.31 | (−2)–0                    | −1.33 ± 0.29 | (−2)–0       | −0.67 ± 0.67 | (−2)–0       | abc ns                                                           |
| Waterfowl                                        | −0.71 ± 0.36 | (−2)–0                    | −1.17 ± 0.40 | (−2)–0       | −0.67 ± 0.67 | (−2)–0       | abc ns                                                           |
| Tree-dwelling animals                            | −0.33 ± 0.33 | (−2)–0                    | −1.00 ± 0.45 | (−2)–0       | −0.67 ± 0.67 | (−2)–0       | abc ns                                                           |
| Ground-dwelling animals                          | −0.89 ± 0.26 | (−2)–0                    | −1.13 ± 0.30 | (−2)–0       | −0.67 ± 0.67 | (−2)–0       | abc ns                                                           |
| Aquatic animals                                  | −0.50 ± 0.34 | (−2)–0                    | −0.71 ± 0.36 | (−2)–0       | −0.50 ± 0.50 | (−2)–0       | abc ns                                                           |
| Threatened, Endangered, and/or Sensitive species | −1.00 ± 0.38 | (−2)–0                    | −1.29 ± 0.36 | (−2)–0       | −0.67 ± 0.67 | (−2)–0       | abc ns                                                           |
| Other (monk seal/humans/domesticated dogs)       | -            | -                         | -            | -            | -            | -            | -                                                                |
| Overall Mean:                                    | −0.67        |                           | −1.11        |              | −0.64        |              |                                                                  |

<sup>1</sup> Rating scale: “definite concern”: −2, “some concern”: −1, “no concern”: 0, “some benefit”: +1, “definite benefit”: +2; Statistical comparisons: <sup>a</sup> dogs vs. cats, <sup>b</sup> ferrets vs. dogs, <sup>c</sup> ferrets vs. cats; sem: standard error of the mean; ns: nonsignificant.

### 3.5. Classifications

Table 5 shows the terms used by agencies to classify dogs, cats, and ferrets. Overwhelmingly, dogs and cats were classified as “house-pet” or “companion” animal by both state and provincial agencies (>76%) and county agencies of California (90%), in contrast to ferrets (54% and 10%, respectively). There was much greater recognition of dogs and cats as “domestic” or “domesticated” (>80%), versus ferrets (states/provinces: 61%; California counties: 14%). Ferrets were frequently identified as “exotic” animals (states/provinces: 26%; California counties: 59%), whereas dogs and cats were not (0–3%). A minority of state and provincial agencies classified ferrets as “listed, restricted, not permitted” (7%) or “restricted, except under permit” (3%), whereas most, but not all, California county agencies classified ferrets as such (38% and 41%, respectively).

**Table 5.** Terms used by agencies to classify dogs, cats, ferrets.

| Classification                              | Dogs     | Cats     | Ferrets  |
|---------------------------------------------|----------|----------|----------|
| United States, DC and Canada                |          |          |          |
| “House-pet” or “Companion”                  | 56 (78%) | 55 (76%) | 39 (54%) |
| “Domestic” or “Domesticated”                | 59 (82%) | 58 (81%) | 44 (61%) |
| “Exotic animal”                             | 1 (1%)   | 2 (3%)   | 19 (26%) |
| “Non-game”                                  | 9 (13%)  | 9 (13%)  | 10 (14%) |
| “Fur-bearing”                               | 0        | 1 (1%)   | 8 (11%)  |
| “Laboratory” or “Research”                  | 13 (18%) | 13 (18%) | 9 (13%)  |
| “Wild” or Wildlife”                         | 2 (3%)   | 2 (3%)   | 7 (10%)  |
| “Unlisted” or “Unrestricted” or “Permitted” | 10 (14%) | 9 (13%)  | 14 (19%) |
| “Listed” or “Restricted” or “Not permitted” | 3 (4%)   | 2 (3%)   | 2 (3%)   |
| “Restricted, except under a permit”         | 0        | 0        | 5 (7%)   |
| Other (Please specify in Comments)          | 1 (1%)   | 2 (3%)   | 2 (3%)   |
| No Classification                           | 9 (13%)  | 11 (15%) | 12 (17%) |
| California Counties                         |          |          |          |
| “House-pet” or “Companion”                  | 26 (90%) | 26 (90%) | 3 (10%)  |
| “Domestic” or “Domesticated”                | 26 (90%) | 25 (86%) | 4 (14%)  |
| “Exotic animal”                             | 0        | 1 (3%)   | 17 (59%) |
| “Non-game”                                  | 12 (41%) | 11 (38%) | 9 (31%)  |
| “Fur-bearing”                               | 2 (7%)   | 2 (7%)   | 8 (28%)  |
| “Laboratory” or “Research”                  | 8 (28%)  | 7 (24%)  | 3 (10%)  |
| “Wild” or Wildlife”                         | 2 (7%)   | 1 (3%)   | 8 (28%)  |
| “Unlisted” or “Unrestricted” or “Permitted” | 6 (21%)  | 6 (21%)  | 2 (7%)   |
| “Listed” or “Restricted” or “Not permitted” | 1 (3%)   | 1 (3%)   | 11 (38%) |
| “Restricted, except under a permit”         | 1 (3%)   | 0        | 12 (41%) |
| Other (Please specify in Comments)          | 0        | 0        | 1 (3%)   |
| No Classification                           | 3 (10%)  | 3 (10%)  | 2 (7%)   |

### 3.6. Actions Taken

Agencies were asked to list the actions undertaken when a free-roaming animal is found in their jurisdiction. Overall, agencies reported a wide-range of actions taken (Table 6). California county agencies reported that free-roaming dogs and cats were assumed to be lost pets (dogs: 67%, cats: 55%) that were trapped and then taken to shelters. At the state-provincial level, 40% of responders reported making “referrals to another agency”, which likely may have included animal control at a more local level. Despite reports of negative effects from free-roaming dogs and cats on wildlife and a high “degree of concern”, a small number of agencies reported that they would not take action, as it was “not considered to be important”. For free-roaming cats, 21% state/provincial agencies and 12% California county agencies reported that no action would be taken, as it was “desirable, but not feasible” to do so.

**Table 6.** Actions taken by agencies for unconfined dogs, cats, ferrets.

| Action Taken                                          | Dogs     | Cats     | Ferrets  |
|-------------------------------------------------------|----------|----------|----------|
| United States, DC, and Canada                         |          |          |          |
| None: not considered to be important                  | 2 (3%)   | 3 (4%)   | 8 (11%)  |
| None: desirable, but not feasible                     | 12 (17%) | 15 (21%) | 9 (13%)  |
| Live trap/take to shelter (assumed lost pet)          | 17 (24%) | 15 (21%) | 8 (11%)  |
| Live trap/euthanize                                   | 8 (11%)  | 10 (14%) | 7 (10%)  |
| Live trap/transport (specify destination in Comments) | 7 (10%)  | 9 (13%)  | 4 (6%)   |
| Take by any means                                     | 10 (14%) | 5 (7%)   | 4 (6%)   |
| Refer to another agency (specify in Comments)         | 27 (38%) | 24 (34%) | 19 (27%) |
| Attempt eradication                                   | 3 (4%)   | 4 (6%)   | 4 (6%)   |
| Unknown                                               | 3 (4%)   | 4 (6%)   | 8 (11%)  |
| California Counties                                   |          |          |          |
| None: not considered to be important                  | 1 (3%)   | 3 (9%)   | 2 (6%)   |
| None: desirable, but not feasible                     | 0        | 4 (12%)  | 0        |
| Live trap/take to shelter (assumed lost pet)          | 22 (67%) | 18 (55%) | 6 (18%)  |
| Live trap/euthanize                                   | 7 (21%)  | 7 (21%)  | 5 (15%)  |
| Live trap/transport (specify destination in Comments) | 4 (12%)  | 3 (9%)   | 2 (6%)   |
| Take by any means                                     | 5 (15%)  | 2 (6%)   | 4 (12%)  |
| Refer to another agency (specify in Comments)         | 4 (12%)  | 4 (12%)  | 13 (40%) |
| Attempt eradication                                   | 2 (6%)   | 1 (3%)   | 2 (6%)   |
| Unknown                                               | 0        | 0        | 1 (3%)   |

### 3.7. “Special Concerns”

“Special concerns” were provided by 52 (35-state/provincial; 17 California county) agencies. The majority of commenters at the state and provincial levels represented fish and wildlife agencies, and at the county level, animal control. Cats were mentioned most often (22–43%), with “feral” cats listed as a major concern based on their impact on wildlife and disease transmission, such as rabies, followed by dogs (13–25%), and specifically dogs “off-leash”. Only six (3-state/provincial and 3-county) agencies mentioned ferrets. Commenters from state/provincial agencies called out that no “feral” or “wild ferrets” existed within their jurisdiction, or that ferrets posed little or no concern. One California county agency expressed concerns that unconfined ferrets and cats could potentially cause harm to native animals; two counties commented that ferrets were “not legal” in the state.

## 4. Discussion

This is the first survey to compare the environmental impact of three non-native domestic carnivores. While other surveys have addressed the impact of free-roaming dogs, cats or ferrets, none has conducted a head-to-head comparison nor described the relative impact of these carnivores on the wildlife of North America [14,32,33]. A key advantage of this survey over those conducted by governmental bodies or well-known organizations is the anonymity of SeaSearch; which, holds no public position or political agenda that would influence the responder. Due to the uniformity of the respondents; who had similar roles and backgrounds in their respective agencies; as well as the relatively small number of nonresponders; concern regarding “non-response” bias was minimized [34,35]. Limitations to this study, however, include the inherent inaccuracies of retrospective reporting (“recall error”), intra-observer variation due to individual bias or experience, potential impact of local laws, regulation and practices, as well as a lack of documentation from respondents supporting their ratings [36,37].

The results from the current study showed remarkable consistency with prior reports. In this survey, the existence of feral cats and dogs was consistently reported, as well as their profound impact on local wildlife. Free-roaming cats were identified as having the greatest environmental impact. Under “special concerns” Hawaii stated “There are significantly more cats than there are dogs in free roaming populations”. One of the biologists estimates a 9:1 ratio. Iowa reported: “Our biggest

concerns would be free-ranging or feral cats and their potential impact on wildlife". New York voiced a concern of many of the states: "In the case of dogs and cats, these animals directly kill and injure countless numbers of small mammals and birds up to and including white-tailed deer. . .". Quebec described its management efforts: "In the past years, we have had problems with racoon (sic) rabies. In an operation to control the disease, in southern Quebec in 2007, we have captured 10,000 racoons (sic) and 3500 domestic cats and only a few dogs. . .".

Aside from an occasional "stray", there were no reports of "feral (breeding)" ferrets; nor were there reports that of "free-living", or "naturalized" ferrets anywhere in the continental United States or Canada, including California. More importantly, no jurisdiction reported ferrets impacting local (native) wildlife, including ground-nesting birds, or threatened, endangered and sensitive species.

Except for state requirements for licensing and routine immunization, most animal control activities are at the level of local government and the private sector. Cities, county parks and recreation, and housing and homeowners' associations often impose "nuisance" and "leash" laws, limits on the number of allowable animals, and restrictions on ownership of certain dog breeds, such as pit bulls [38,39]. However, California, under a 1933 law, regulates ferrets as "wildlife", prohibiting their sale or possession within the state [40]. Concern over the ferret's invasive potential has been largely based on reports from island nations where deliberate introductions of species resulted in feral ferrets and other domestic species, which caused harm to the local ecosystems [30,31,40]. In its response to the current survey, neither the state nor its county agencies reported feral ferrets or environmental harm caused by ferrets, confirming the state's own nation-wide survey [32]. The sum of the results calls into question the relevancy of insular experiences to a state that is contiguous with the North American continent.

Regardless, demands that "solid scientific evidence demonstrating no risk to our native wildlife and their habitats" regarding the ferret have continued [41], whereas most government agencies have taken little action to curtail free-roaming cats and dogs in the face of irrefutable evidence of profound negative environmental impact. Such regulatory bias may have less to do with objective data and more to do with human nature [42,43]. Public attitudes and opinions towards various animals have been shown to be affected by "the perceived attractiveness and usefulness of the species involved, indigenous or non-indigenous" [44]. The current study appears to support this conclusion. As "special concerns", New York writes: ". . . If pesticides were the cause of the numbers of wild animals and birds injured or killed each year by domestic and feral house cats, the public would demand action to halt this destruction. However, when there is direct evidence of such wanton waste by domestic and feral house cats, the cat-lovers effectively threaten the elected officials from taking any actions to rid the environment of these introduced predators".

Terminology used by agencies in describing these animals is also revealing. In the present study, dogs and cats are recognized as "house pets"—"companion" animals, and "domestic"—"domesticated" species (Table 3), whereas the ferret is considered "exotic". "Exotic" means "foreign" and "not-native", which makes the ferret no more "exotic" than the cat or dog (with the sole exception of the Alaskan malamute). The fact that the veterinary community refers to all small animals that are "not dogs or cats" as "exotic animals" undoubtedly contributes to the public's view of these respective carnivores [45].

Moreover, in its current state code, California lists the ferret as a "detrimental" animal "not normally domesticated in this state", whereas the Asian water buffalo (*Bubalus bubalis*), a relatively recent introduction to the state is considered a "welfare animal", a mammal so "listed to prevent the depletion of wild populations and to provide for animal welfare" [46,47]. Such distinction reflects on societal values that go far beyond scientific principles to our cultural roots and perceptions and, on a more pragmatic level, to hardline economics: it is the water buffalo that produces a sought-after mozzarella cheese—not so for the ferret [48]. The labeling of the ferret as *not domestic* hence "wild" is not without consequence. Palmer argues that it changes the human-animal social contract, from one of caring and protection extended to domestic and companion animals, to a hands-off "laissez faire

intuition”, that, as humans, intuitively we do not experience the same moral obligation towards an animal that by nature is “wild” [49].

The global policy initiatives to prevent and eradicate non-native species, which arose over concerns of “biological invasion”, are only recently undergoing re-examination [3,50,51]. Not only is there growing disagreement over what constitutes “harm”, arguably some species can be both “good” and “bad” for their new environment, “depending on the location and the perceptions of the observers” [13,50]. In 2006, the US National Invasive Species Council (NISC) cautioned: “Many alien species are non-invasive and support human livelihoods or a preferred quality of life” [44]. Under certain conditions, even native organisms have been shown to exhibit “invasiveness” within their own natural habitats [43]. More importantly, introduction of nonnative species has in some instances resulted in an increase in overall biodiversity [52].

NISC provides additional cautions: “Because invasive species management is difficult and often very expensive, (the) worst offenders are the most obvious and best targets for policy attention and management” [53]. Based on current evidence for the North American continent, the ferret is a low probability target, whereas unconfined dogs and cats, particularly in the feral state, should rank high among the list of management priorities. The true target, however, may be management of public attitudes and perceptions regarding these and other non-native species.

## 5. Conclusions

This survey confirms the negative impact from free-roaming cats and dogs on native North American wildlife, while demonstrating the absence of any discernible impact from the ferret. Based on evidence of substantial environmental impact and harm, unconfined cats and the dogs meet the definition for “invasive” species, whereas the ferret does not on this continent. Results from this study display the differences among three carnivore species and their relative impact on the North American ecosystem. Public attitudes and perceptions regarding these species, however, may play a role in agency control efforts and management priorities.

**Supplementary Materials:** The following are available online at <http://www.mdpi.com/2076-2615/7/10/78/s1>: the supplementary questionnaire; Table S1: Existence of incidents of unconfined dogs, cats, ferrets: impact on wildlife, Table S2: Existence of incidents of unconfined dogs, cats, ferrets: impact on wildlife in parts-recreational areas.

**Acknowledgments:** SeaSearch Biological Surveys is a privately-owned consultancy that selects and funds its own research for scientific purposes. SeaSearch wishes to thank Cynthia Sinclair and Carmen Tamayo for their assistance in preparation of this document and for its editorial review.

**Author Contributions:** M. Scott Sinclair, a wild-life biologist, identified, funded and directed the project. The team identified the agency contacts, disseminated the questionnaires, received and organized the response data. Valerie Kaplan was instrumental in the design of the questionnaire, developed the electronic version, and set up the initial database, with the assistance of Robert Szpanderfer, IT director. Alirio Arreaza revised the database, and prepared in the initial figures and tables. Ana Lepe finalized the database with the assistance of Robert Szpanderfer, performed the analyses with the help of the team, and drafted the manuscripts for publication. David Bristol conducted the final statistical analyses and prepared the statistical section of the manuscript. All authors read and approved the final manuscript.

**Conflicts of Interest:** The authors declare no conflict of interest.

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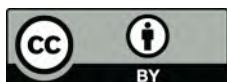
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The following Supplemental Tables represent the data upon which Figures 3 and 4, respectively, are based.

Table S1: Existence of incidents of unconfined dogs, cats, ferrets: impact on wildlife

| Effects on Wildlife                              | Dogs       |              | Cats       |              | Ferrets    |              | p-value                                                        |
|--------------------------------------------------|------------|--------------|------------|--------------|------------|--------------|----------------------------------------------------------------|
|                                                  | Mean ± SEM | Rating Range | Mean ± SEM | Rating Range | Mean ± SEM | Rating Range |                                                                |
| United States, DC and Canada                     |            |              |            |              |            |              |                                                                |
| Tree-dwelling and/or- nesting birds              | 1.82 ±0.24 | 0-4          | 3.16 ±0.18 | 0-4          | 0.65 ±0.10 | 0-2          | <sup>abc</sup> p<0.001                                         |
| Ground-dwelling and/or- nesting birds            | 2.68 ±0.21 | 0-4          | 3.23 ±0.18 | 0-4          | 0.69 ±0.10 | 0-2          | <sup>a</sup> ns<br><sup>bc</sup> p<0.001                       |
| Waterfowl                                        | 2.45 ±0.24 | 0-4          | 2.82 ±0.22 | 0-4          | 0.69 ±0.10 | 0-2          | <sup>a</sup> ns<br><sup>bc</sup> p<0.001                       |
| Tree-dwelling animals                            | 1.97 ±0.25 | 0-4          | 2.95 ±0.23 | 0-4          | 0.69 ±0.10 | 0-2          | <sup>a</sup> p<0.01<br><sup>bc</sup> p<0.001                   |
| Ground-dwelling animals                          | 2.62 ±0.22 | 0-4          | 3.03 ±0.21 | 0-4          | 0.69 ±0.10 | 0-2          | <sup>a</sup> ns<br><sup>bc</sup> p<0.001                       |
| Aquatic animals                                  | 1.86 ±0.26 | 0-4          | 2.27 ±0.27 | 0-4          | 0.67 ±0.10 | 0-2          | <sup>a</sup> ns<br><sup>bc</sup> p<0.001                       |
| Threatened, endangered, and/or sensitive species | 2.38 ±0.23 | 0-4          | 3.05 ±0.22 | 0-4          | 0.67 ±0.10 | 0-2          | <sup>a</sup> p<0.05<br><sup>bc</sup> p<0.001                   |
| Other [monk seal, big game animals]              | 1.75 ±0.85 | 0-4          | 0.00       | 0            | 0.00       | 0            | -                                                              |
| Overall Mean:                                    | 2.19       |              | 2.56       |              | 0.59       |              |                                                                |
| California counties                              |            |              |            |              |            |              |                                                                |
| Tree-dwelling and/or- nesting birds              | 1.24 ±0.36 | 0-4          | 2.40 ±0.30 | 0-4          | 0.17 ±0.11 | 0-1          | <sup>ab</sup> p<0.05<br><sup>c</sup> p<0.001                   |
| Ground-dwelling and/or- nesting birds            | 1.44 ±0.36 | 0-4          | 2.32 ±0.33 | 0-4          | 0.18 ±0.12 | 0-1          | <sup>a</sup> ns<br><sup>b</sup> p<0.05<br><sup>c</sup> p<0.001 |
| Waterfowl                                        | 1.63 ±0.40 | 0-4          | 1.67 ±0.21 | 0-4          | 0.18 ±0.12 | 0-1          | <sup>a</sup> ns<br><sup>b</sup> p<0.01<br><sup>c</sup> p<0.001 |
| Tree-dwelling animals                            | 1.33 ±0.39 | 0-4          | 1.60 ±0.39 | 0-4          | 0.18 ±0.12 | 0-1          | <sup>a</sup> ns<br><sup>b</sup> p<0.05<br><sup>c</sup> p<0.01  |
| Ground-dwelling animals                          | 2.00 ±0.42 | 0-4          | 2.24 ±0.38 | 0-4          | 0.20 ±0.13 | 0-1          | <sup>a</sup> ns<br><sup>bc</sup> p<0.001                       |
| Aquatic animals                                  | 0.33 ±0.19 | 0-2          | 0.75 ±0.35 | 0-4          | 0.10 ±0.10 | 0-1          | <sup>abc</sup> ns                                              |
| Threatened, endangered, and/or sensitive species | 1.20 ±0.42 | 0-4          | 1.40 ±0.41 | 0-4          | 0.18 ±0.12 | 0-1          | <sup>ab</sup> ns<br><sup>c</sup> p<0.05                        |
| Other [monk seal, big game animals]              | 0.00       | 0            | 0.00       | 0            | 0.00       | 0            | -                                                              |
| Overall Mean:                                    | 1.15       |              | 1.55       |              | 0.15       |              |                                                                |

Rating scale: "definite concern": -2, "some concern": -1, "no concern": 0, "some benefit": +1, "definite benefit": +2; Statistical comparisons: <sup>a</sup> dogs vs. cats, <sup>b</sup> ferrets vs. dogs, <sup>c</sup> ferrets vs. cats, ns: nonsignificant.

Table S2: Existence of incidents of unconfined dogs, cats, ferrets: impact on wildlife in parks and recreational areas

| Effects on Parks/Beaches                         | Dogs       |              | Cats       |              | Ferrets    |              | p-value                                                            |
|--------------------------------------------------|------------|--------------|------------|--------------|------------|--------------|--------------------------------------------------------------------|
|                                                  | Mean ± SEM | Rating Range | Mean ± SEM | Rating Range | Mean ± SEM | Rating Range |                                                                    |
| United States, DC and Canada                     |            |              |            |              |            |              |                                                                    |
| Tree-dwelling and/or- nesting birds              | 1.51 ±0.23 | 0-4          | 2.56 ±0.24 | 0-4          | 0.70 ±0.10 | 0-2          | <sup>a</sup> p<0.01<br><sup>b</sup> p<0.05<br><sup>c</sup> p<0.001 |
| Ground-dwelling and/or- nesting birds            | 2.38 ±0.24 | 0-4          | 2.78 ±0.24 | 0-4          | 0.70 ±0.10 | 0-2          | <sup>a</sup> ns<br><sup>bc</sup> p<0.001                           |
| Waterfowl                                        | 2.33 ±0.25 | 0-4          | 2.53 ±0.24 | 0-4          | 0.70 ±0.10 | 0-2          | <sup>a</sup> ns<br><sup>bc</sup> p<0.001                           |
| Tree-dwelling animals                            | 1.74 ±0.24 | 0-4          | 2.56 ±0.26 | 0-4          | 0.66 ±0.11 | 0-2          | <sup>a</sup> p<0.05<br><sup>bc</sup> p<0.001                       |
| Ground-dwelling animals                          | 2.26 ±0.24 | 0-4          | 2.68 ±0.25 | 0-4          | 0.67 ±0.10 | 0-2          | <sup>a</sup> ns<br><sup>bc</sup> p<0.001                           |
| Aquatic animals                                  | 1.74 ±0.24 | 0-4          | 2.00 ±0.26 | 0-4          | 0.71 ±0.12 | 0-2          | <sup>a</sup> ns<br><sup>bc</sup> p<0.001                           |
| Threatened, endangered, and/or sensitive species | 2.17 ±0.24 | 0-4          | 2.63 ±0.25 | 0-4          | 0.69 ±0.10 | 0-2          | <sup>a</sup> ns<br><sup>bc</sup> p<0.001                           |
| Other [monk seal/ humans/ domesticated dogs]     | 2.67 ±1.33 | 0-4          | 2.00 ±2.00 | 0-4          | 0.33 ±0.33 | 0-2          | abc <sup>ns</sup>                                                  |
| Overall Mean:                                    | 2.10       |              | 2.47       |              | 0.64       |              |                                                                    |
| California counties                              |            |              |            |              |            |              |                                                                    |
| Tree-dwelling and/or- nesting birds              | 0.58 ±0.19 | 0-2          | 1.77 ±0.48 | 0-4          | 0.20 ±0.13 | 0-1          | <sup>a</sup> c <sup>c</sup> p<0.05<br><sup>b</sup> ns              |
| Ground-dwelling and/or- nesting birds            | 1.23 ±0.30 | 0-3          | 1.85 ±0.46 | 0-4          | 0.20 ±0.13 | 0-1          | <sup>a</sup> ns<br><sup>bc</sup> p<0.01                            |
| Waterfowl                                        | 0.92 ±0.23 | 2            | 1.25 ±0.37 | 0-4          | 0.20 ±0.13 | 0-1          | <sup>a</sup> ns<br><sup>bc</sup> p<0.05                            |
| Tree-dwelling animals                            | 0.67 ±0.14 | 0-1          | 1.08 ±0.38 | 0-4          | 0.20 ±0.13 | 0-1          | <sup>a</sup> ns<br><sup>bc</sup> p<0.05                            |
| Ground-dwelling animals                          | 1.38 ±0.33 | 0-4          | 1.54 ±0.40 | 0-4          | 0.20 ±0.13 | 0-1          | <sup>a</sup> ns<br><sup>bc</sup> p<0.01                            |
| Aquatic animals                                  | 0.42 ±0.19 | 0-2          | 0.75 ±0.35 | 0-4          | 0.10 ±0.10 | 0-1          | abc <sup>ns</sup>                                                  |
| Threatened, endangered, and/or sensitive species | 0.75 ±0.25 | 0-2          | 1.25 ±0.41 | 0-4          | 0.20 ±0.13 | 0-1          | <sup>ab</sup> ns<br><sup>c</sup> p<0.05                            |



|                                                 |             |   |             |   |             |   |   |
|-------------------------------------------------|-------------|---|-------------|---|-------------|---|---|
| Other [monk seal/ humans/<br>domesticated dogs] | 4.00        | 4 | 1.00        | 1 | 0.00        | 0 | - |
| Overall Mean:                                   | <b>1.24</b> |   | <b>1.31</b> |   | <b>0.16</b> |   |   |

Rating scale: “definite concern”: -2, “some concern”: -1, “no concern”: 0, “some benefit”: +1, “definite benefit”: +2; Statistical comparisons: <sup>a</sup> dogs vs. cats, <sup>b</sup> ferrets vs. dogs, <sup>c</sup> ferrets vs. cats, ns: nonsignificant.



## RESEARCH ARTICLE

# Impact of Free-Roaming Domestic Carnivores on North American Agriculture: a Survey of Government Agencies

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## Abstract

Over millennia dogs, cats, and ferrets became domesticated in part due to their respective roles in the management of agricultural resources. When allowed to roam free of human control (“unconfined”), these carnivores have the potential to harm or kill livestock, destroy crops and property, and become vectors for disease transmission. As part of a larger environmental survey, government agencies of the United States and Canada were queried regarding the number and frequency of sightings of unconfined dogs, cats, and ferrets in agricultural areas, evidence for harm, and resulting degree of concern for livestock, agricultural crops, and fisheries. Of the 119 jurisdictions queried, 107 (89.9%) had agriculture components. Twenty-five (23.4%) reported the existence of “incidents” (impact) from unconfined dogs and cats on agriculture, which 14 (13.0%) agencies rated as “definitely a concern” to livestock and crops. Cat sightings exceeded those for dogs in both frequency and absolute animal numbers, although differences did not reach statistical significance. Twenty-one (19.6%) respondents reported ferrets as “rarely” or “never seen” in agricultural settings, and no agency reported an impact from ferrets on livestock, fisheries, or crops. Balancing today’s societal perceptions regarding the benefits of employing domestic carnivores in the agricultural setting against the potential risks, remains an important policy and management debate.

**Keywords:** Agriculture; Domestic carnivores; Free-roaming, North America; Survey

## Introduction

Three carnivore species, the dog (*Canis lupus familiaris*), the cat (*Felis silvestris catus*), and the ferret (*Mustela putorius furo*), have been closely associated with humans, initially as working animals and more recently as companion animals [1, 2]. Encounters between humans and dogs began an estimated 10,000 to 40,000 years ago [3-5]. Cats interfaced with humans starting around 7,000 years ago, although more recent estimates go back 10,000 years [6]. Although less well-documented, the ferret’s interactions with humans may extend back at least 2,500 years [7, 8]. There is general agreement, however, that animal and plant domestication underwent explosive expansion during the Neolithic Period, 10,000 to 12,000 years ago, with the introduction of agriculture [9].

Animal domestication has been described as an interactive process “based on a shared need for shelter, food and protection [10].” The transition of prehistoric humans from “hunters and gatherers” to agrarian societies resulted in changes in the carnivores that performed necessary functions in the agricultural setting. Cats cemented their beneficial role in protecting valuable crops from damaging pests both in the field and during storage. Cats today are being “employed” as working animals to control pests on farms, ranges, mills and warehouses [11, 12]. Dogs, while historically utilized for protection and for tracking and chasing prey alongside early humans during the hunt, became tasked with guarding and

managing livestock. Domestication of dogs can be tracked through dietary changes, reflected in genomic alterations signaling increased intake of agricultural crops, in contrast to the strict carnivorous diet of wild canids [13]. The later breeding of dogs by humans allowed dogs to assume highly specific roles in hunting and agriculture, exemplified by hounds, terriers, and retrievers which search out and return prey, and by shepherds bred for herding and protecting livestock. Dogs today are being trained to identify crop contamination and disease [14], and to screen for harmful plant pests and for foreign animal diseases at the US borders [15].

The ferret also participated in the hunt. Due to their diminutive size (1 to 4 pounds) and streamlined body habitus, ferrets were used to flush out rabbits and other small prey and to control rodent populations [16]. The domestic ferret is thought to have arisen from a subspecies of the wild European polecat, *M. putorius*, a species distinct from that of the wild, highly endangered Black-footed Ferret (*M. nigripes*) of the North American western plains [17]. In the early part of the 20<sup>th</sup> century, the United States Department of Agriculture (USDA)

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**Received:** June 15, 2020; **Accepted:** June 18, 2020; **Published:** June 22, 2020

\*This article is reviewed by Fernandez A

actively promoted the use of ferrets for agricultural purposes. An official USDA brochure recommended that ferrets be raised or purchased by farmers to rid barns and warehouses of rodents [18]. Other books, such as “Ferret-Keeper” (1912), described the care, breeding, and training of domestic ferrets as work animals [19].

As humans migrated to new geographic regions, including the Americas, they brought with them domestic carnivores to protect the food supply. Introduction of these non-native species resulted in unwanted effects on local habitats and wildlife. Where supply of native or introduced prey was adequate, some domestic carnivores have become free-roaming, forming natural-breeding (feral) populations. Left unchecked, their subsequent impact on agricultural resources is best summed up by Baker, et al.: “At present, carnivores affect food production by: (i) killing human producers; killing and/or eating (ii) fish/shellfish; (iii) game/wildfowl; (iv) livestock; (v) damaging crops; (vi) transmitting diseases; and (vii) through trophic interactions with other species in agricultural landscapes [20].”

In an attempt to document the negative effects of free-roaming domestic carnivores, the state agricultural departments of the United States conducted a survey in 1974. The data, while considered “inconclusive” at the time, showed dogs to be the major cause of livestock damage [21]. In 1990, the state of Texas reported on the adverse effects of feral dog packs, known to kill deer, rabbits, domestic cattle, sheep, and goats, amounting to “\$5 million in damage to livestock annually [22].” Bergman, et al., reviewed a decade (1997-2006) of reports submitted to the USDA Animal and Plant Health Inspection Service (APHIS) and US wildlife services, in which feral dogs were documented to exist in all 50 states, causing damage to livestock and other agricultural resources that exceeded \$620 million annually. The majority of damage from free-roaming dogs was to sheep, goats, and cattle [23, 24].

The source of offending animals may be tracked to the increasing “pet” populations. As of 2017, estimated numbers in the US were: 89.7 million dogs; and 94.2 million cats [25]. As many as 7 million domestic ferrets have been reported in the US, of which approximately 500,000 ferrets exist in California by the state’s own reporting [26, 27]. Although numbers of unconfined domestic carnivores are largely unknown, the resulting economic impact is not insignificant. Free-roaming carnivores are known to be opportunistic feeders, making them potential threats both to wildlife and to livestock [28-32]. In 2013, Loss, et al., reported unconfined cats killed from 1.3 to 4.0 billion birds and 6.3 to 22.3 billion mammals annually in the US, accounting for an estimated 14 billion dollars per year in damage. A US study of “free-ranging” cats in and around livestock conducted by the Northwest Georgia Unit (US), reported that “...rodents and lagomorphs were the preferred prey of cats; birds, invertebrates, and reptiles are also hunted, depending on mammal availability and geographic location.” Aside from predation, unconfined dogs are reported to chase and harass both livestock and humans, disrupting the normal behavior of their targets, as well as causing damage

to crops and to agricultural irrigation systems. Without proper healthcare domestic carnivores may cause spread of diseases, such as rabies, distemper, and Rocky Mountain spotted fever [33].

Ownership of dogs and cats is legal throughout the North American continent and the surrounding islands; however, ferrets are prohibited in the following jurisdictions: Hawaiian Islands, California (CA); and the city of New York [34-36]. In 1933, CA categorized the domestic ferret as a “wild” animal, thereby outlawing its sale and possession in the absence of a state-issued permit. Responding to legislation to re-legalize the ferret, CA state agencies claimed (among other reasons) that “[t]he European ferret’s predacious nature and wanton destruction of poultry, rabbits and other small livestock is well documented...” and concluding that ferrets, if legalized, would be harmful to the state’s vast agricultural resources [37].

To examine the impact of dogs, cats, and ferrets on the environment and on agricultural resources, SeaSearch Biological Surveys (SeaSearch) undertook a survey of the state and provincial agencies of the US and Canada (CAN), respectively. Both CA state and county agencies were included, in view of the state’s significant agribusiness and its publicized concerns over the existence of ferrets and their potential impact on agriculture within the state. Results from the environmental portion of the survey have been previously published [38]. This current report focuses on the agricultural survey data. Specifically, study objectives included the documentation and the effects (“impact”) from unconfined dogs, cats, and ferrets on agriculture resources.

## Materials and Methods

A survey was conducted of government agencies, as previously described. Briefly, agency personnel were contacted by e-mail, telephone, and facsimile representing natural or environmental resources, fish, game and wildlife, agriculture, recreational areas (parks, beaches), human and veterinary health departments (e.g., “State Veterinarian”), where such a department or position had been designated. The CA county agencies included agriculture, animal control, health, and parks and beaches as pertinent for the particular county. The survey was in the form of a questionnaire, which was distributed electronically in .pdf format (Adobe Acrobat®), by facsimile, or mailed in “hard-copy.” Upon receipt, completed surveys and correspondence were saved in or converted to electronic media, and the data set was maintained in an electronic database (Microsoft Access®).

Agency personnel were queried regarding the “frequency of sightings,” of unconfined dogs, cats, and ferrets, the “existence of incidents” on livestock, fisheries, and crops, and the “degree of concern” regarding harm to agriculture this created within the respondents’ jurisdictions. An “unconfined” animal was defined as outside the control of humans, i.e., “stray,” released or abandoned, or one that has become “feral” or “naturalized.”

Responses categories were: “completed survey” (S), “nonsurvey response” (NS), or “nonresponse” (NR). NS was

used when some identifying information was provided in the absence of response to the actual survey questions (e.g., “we are the wrong agency”). Failure or refusal to respond in the absence of any responsive information was recorded as a “nonresponse” (NR). Prior to designating a NR, multiple attempts were made to reach the agency or individual, which were documented. The results reported herein reflect all responding state or provincial agencies (S + NS). Separate analyses were performed for the CA county agencies.

Respondents were asked to report the observed “frequency of unconfined animal sightings” in various settings, one of which was designated “rural-agricultural.” In the section “effects on agriculture” respondents were instructed to identify the impact of unconfined domestic carnivores based on the “existence of incidents” on livestock and crops in their respective jurisdictions and to rate the “degree of concern” caused by unconfined domestic carnivores. For “animals sighted,” respondents were instructed to select from a list of descriptors regarding whether they were deemed as “pets,” “stray or feral,” or “naturalized animals.” Each respondent was also asked how their agency would manage the animals, once sighted. Responses included numerical ratings and narratives, as described in the respective table or figure. The statistical methodologies used in this report have been previously described.

## Results

### Overview

A total of 119 jurisdictions were queried, of which 107 (89.9%) had an agricultural (Ag) component. The state and provincial level consisted of 61 jurisdictions, of which 58 had Ag agencies. However, 59 of the 61 (96.7%) jurisdictions responded to the agricultural section of the survey, representing 108 agencies (85 S; 23 NS). Responding agencies were: 9.3% Ag, 53.7% fish and wildlife, 24.7% State Veterinarian, 12.0% parks and recreation, and 11.1% health department. Of CA’s 58 counties, 35 (60.3%) responded to the survey, of which 32 (91.4%) had an Ag component. The county responses were received from 26.7% Ag, 51.1% animal control, 13.0% parks and recreation,

and 8.9% health departments. Two states, Arizona and Kansas, were rated NR, after no response was received from any of the queried state agencies. Reasons when given for NR by a jurisdiction, were: they did not wish to participate; lacked the funding or time to participate; or refused to participate unless they knew more about the surveyor.

### Sightings of Unconfined Animals – reported by US and CAN agencies

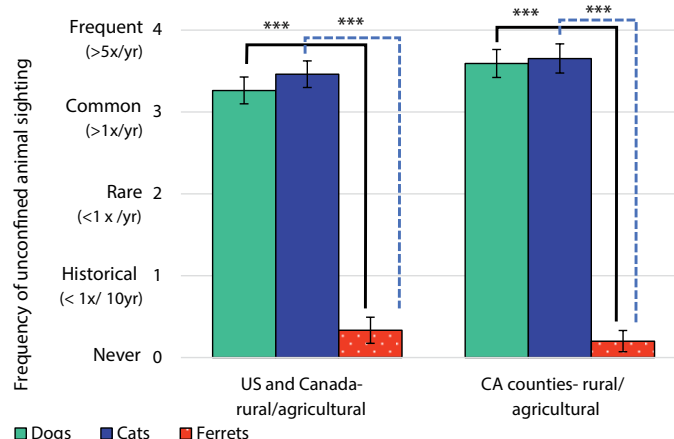
(Figure 1) shows the results for the “frequency of sightings” of unconfined dogs, cats, and ferrets in agricultural settings within the participating jurisdictions. State/provincial agencies rated unconfined cats and dogs as “commonly seen (>1 time per year),” cats sightings reported more frequently than for dogs. CA counties reported similar results. Sightings of unconfined ferrets were generally rated as “never” (cats versus [vs] ferrets:  $p < 0.001$ ; dogs vs ferrets  $p < 0.001$ ).

The “number of animals” observed at each sighting was also recorded [data not shown]. Sightings of single dogs and cats were reported by the states and provinces, whereas the CA county agencies reported seeing dogs and cats more often in groups of 2 or more. Cats specifically were reported in very large numbers, versus dogs or ferrets. The majority of responders rated ferret sightings as nonexistent (“never”), with the few reports submitted qualified as a case of misidentification of local wild mustelids.

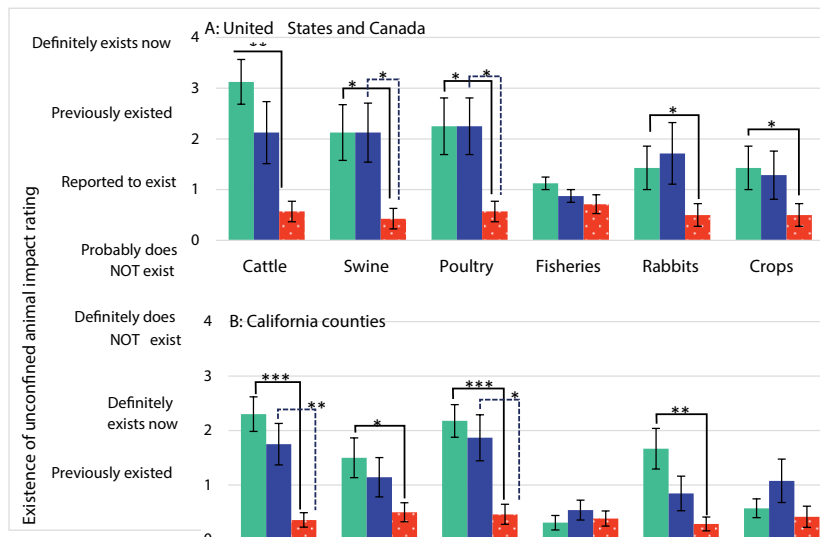
### Impact: Existence of Incidents (“impact”) on Agriculture reported by US and CAN agencies

The impact of unconfined domestic carnivores on livestock, fisheries, and crops, was based on the “existence of incidents,” shown in (Figure 2) and (Table S1). Dogs ranked highest, followed by cats, and then ferrets (overall means: dogs: 2.2; cats: 1.6; ferrets: 0.5). Mean rankings by CA county agencies were lower than those from state/provincial agencies, although the order remained the same (overall means: dogs: 1.2; cats: 1.1; ferrets: 0.3).

For “Cattle,” “Swine,” and “Poultry,” states/provinces ranked incidents from unconfined dogs and cats as “reported to exist”



**Figure 1:** Categorical ratings for “frequency of sighting for unconfined” dogs, cats, and ferrets in rural/agricultural settings for all United States and Canada agencies, including for California (CA) counties. Rating mean  $\pm$  standard error of the mean (sem). Asterisk represents significant difference; \*\*\*  $p < 0.001$ .



**Figure 2:** “Existence of incidents “(impact) on agriculture from unconfined dogs, cats, ferrets reported by all agencies (A) United States, Canada, and (B) California counties. Rating mean  $\pm$  standard error of the mean (sem). Asterisk represents significant difference; \*  $p < 0.05$ , \*\*  $p < 0.01$ , and \*\*\*  $p < 0.001$ .

or “previously existed” (means  $>2$ ). In contrast, incidents from ferrets were consistently rated as “probably did not exist” ( $<1$ ). Rankings compared between dog incidents versus ferrets were statistically significant ( $p < 0.05$ ) for all components except “Fisheries.” Rankings compared cat incidents versus ferrets were statistically significant ( $p < 0.05$ ) for “Swine” and “Poultry.” No other comparisons reached statistical significance.

Similarly, CA county agencies ranked dogs the highest for “existence of incidents” on “Cattle” and “Poultry” ( $>2$ ), whereas cats were ranked lower. Ferrets consistently ranked the lowest, reflecting that incidents from unconfined ferrets “probably do not exist.” Rankings compared between dog incidents versus ferrets were statistically significant ( $p < 0.05$ ) for all components except “Fisheries” and “Crops,” and the rankings compared between cat incidents versus ferrets were statistically significant ( $p < 0.05$ ) for “Cattle” and “Poultry.”

#### “Degree of Concern” reported by US and CAN agencies

Respondents were asked to rank their “degree of concern” from sightings of unconfined dogs, cats, and ferrets, as shown in (Table 1). In the rural/agricultural setting, state/provincial agencies generally responded with the greatest “degree of concern” from the presence of unconfined dogs, and the least concern for ferrets (overall means: dogs: -1.0; cats: -0.6; ferrets: -0.1). Exceptions were cats ranking the greatest concern for “Rabbits” (cats: -1.0; dogs: -0.8; ferrets: 0.0); cats and ferrets were similar for “Fisheries” (cats: -0.3; dogs: -0.4; ferrets: -0.3). For “Cattle” the comparison of rankings between dogs, or cats, versus ferrets were both statistically significant ( $p < 0.05$ ).

The CA county agencies gave similar rankings, rating dogs of greatest concern, and ferrets of least concern (overall means: dogs: -0.8; cats: -0.6; ferrets: -0.2). Cats generated the greatest “degree of concern” for “Fisheries” (cats: -0.7; dogs: -0.3; ferrets: -0.2), and for “Crops” (-0.6; dogs: -0.3; ferrets: -0.2).

Comparisons of rankings between dogs versus ferrets, and dogs versus cats for “Cattle” and “Crops” were statistically significant ( $p < 0.05$ ). Comparisons of rankings between dogs versus ferrets for “Swine,” “Poultry,” and “Rabbits” were statistically significant ( $p < 0.05$ ).

#### Impact: Existence of Incidents on Agriculture - reported by US and CAN agriculture (Ag) agencies

Results from Ag agencies were compared to those from “all agencies” (i.e., inclusive of agencies with other responsibilities), shown at (Figure 3) (see also (Table S2), and (Table 2), respectively. Overall state/provincial Ag agencies ranked the impact (“existence of incidents”) of unconfined animals lower than did “all agencies.” Dogs still ranked highest for impact, followed by cats, and then ferrets (overall means from Ag agencies: dogs: 2.1; cats: 1.3; ferrets: 0.5), and for “Cattle” and “Swine” the impact of dogs versus ferrets reached statistical significance ( $p < 0.05$ ).

Similarly, the CA county Ag agencies also rated dogs and cats as having a greater impact to agricultural resources, than ferrets (overall means: dogs: 1.0; cats: 1.0; ferrets: 0.5), although no interspecies comparisons were statistically significant. Ratings from CA county Ag agencies were overall somewhat lower than those from the state/provincial counterparts, with the exception of impact on “Poultry” and “Rabbits.” Regarding unconfined ferrets, the “existence of incidents” reported by all state/provincial agencies on all agricultural components were ranked as “probably does not exist” (1) to “definitely does not exist” (0); within the CA counties, this was true for “Cattle,” “Fisheries,” “Rabbits,” and “Crops.”

#### “Degree of concern” from unconfined domestic carnivores reported by US and CAN Ag agencies

Table 2 shows the results reported by US and CAN Ag agencies for “degree of concern” due to the “existence of



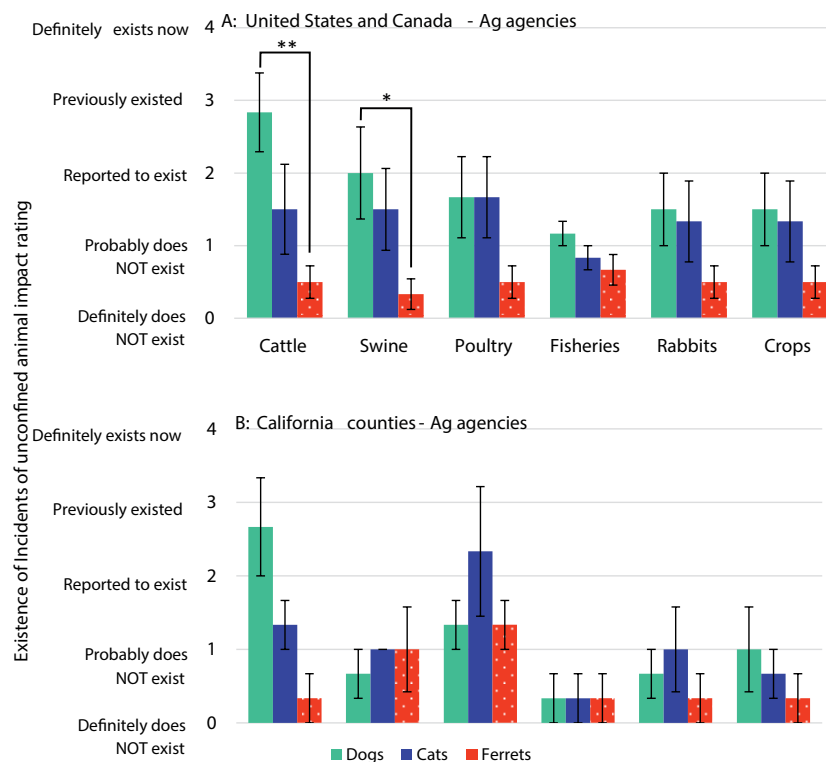
**Table 1:** “Degree of concern” regarding the impact of unconfined animals on agriculture reported by US and CAN agencies

| Effects on Agriculture       | Dogs       |                           | Cats       |              | Ferrets    |              | p- value              |
|------------------------------|------------|---------------------------|------------|--------------|------------|--------------|-----------------------|
|                              | Mean ± sem | <sup>1</sup> Rating Range | Mean ± sem | Rating Range | Mean ± sem | Rating Range |                       |
| United States, DC and Canada |            |                           |            |              |            |              |                       |
| Cattle                       | -1.6 ±0.2  | (-2)-(-1)                 | -0.5 ±0.3  | (-2)-0       | 0.0 ±0.0   | 0            | <sup>a</sup> p<0.05   |
|                              |            |                           |            |              |            |              | <sup>b</sup> p<0.01   |
|                              |            |                           |            |              |            |              | <sup>c</sup> ns       |
| Swine                        | -1.0 ±0.4  | (-2)-0                    | -0.4 ±0.2  | (-1)-0       | 0.0 ±0.0   | 0            | <sup>abc</sup> ns     |
| Poultry                      | -1.5 ±0.3  | (-2)-0                    | -0.8 ±0.2  | (-1)-0       | -0.3 ±0.3  | (-1)-0       | <sup>abc</sup> ns     |
| Fisheries                    | -0.4 ±0.2  | (-1)-0                    | -0.3 ±0.3  | (-1)-0       | -0.3 ±0.3  | (-1)-0       | <sup>abc</sup> ns     |
| Rabbits                      | -0.8 ±0.2  | (-1)-0                    | -1.0 ±0.0  | -1           | 0.0 ±0.0   | 0            | <sup>abc</sup> ns     |
| Crops                        | -0.6 ±0.2  | (-1)-0                    | -0.4 ±0.2  | (-1)-0       | 0.0 ±0.0   | 0            | <sup>abc</sup> ns     |
| Other (Sheep)                | -2.0       | -2                        | -          | -            | -          | -            | -                     |
| Overall Mean:                | -1.1       |                           | -0.6       |              | -0.1       |              |                       |
| California counties          |            |                           |            |              |            |              |                       |
| Cattle                       | -1.5 ±0.2  | (-2)-0                    | -0.5 ±0.3  | (-2)-0       | -0.1 ±0.1  | (-1)-0       | <sup>a</sup> p<0.01   |
|                              |            |                           |            |              |            |              | <sup>b</sup> p<0.001  |
|                              |            |                           |            |              |            |              | <sup>c</sup> ns       |
| Swine                        | -1.2 ±0.2  | (-2)-0                    | -0.5 ±0.3  | (-2)-0       | -0.1 ±0.1  | (-1)-0       | <sup>a</sup> ns       |
|                              |            |                           |            |              |            |              | <sup>b</sup> p<0.01   |
| Poultry                      | -1.4 ±0.2  | (-2)-0                    | -1.2 ±0.3  | (-2)-0       | -0.4 ±0.3  | (-2)-0       | <sup>a</sup> ns       |
|                              |            |                           |            |              |            |              | <sup>b</sup> p<0.01   |
| Fisheries                    | -0.3 ±0.3  | (-2)-0                    | -0.7±0.4   | (-2)-0       | -0.2 ±0.2  | (-1)-0       | <sup>abc</sup> ns     |
| Rabbits                      | -1.2 ±0.3  | (-2)-0                    | -0.6 ±0.3  | (-2)-0       | -0.1 ±0.1  | (-1)-0       | <sup>a</sup> ns       |
|                              |            |                           |            |              |            |              | <sup>b</sup> p<0.05   |
| Crops                        | -0.4 ±0.3  | (-2)-0                    | -0.6 ±0.3  | (-2)-0       | -0.2 ±0.2  | (-1)-0       | <sup>ab</sup> p<0.001 |
|                              |            |                           |            |              |            |              | <sup>c</sup> ns       |
| Other (Sheep)                | 0.0 ±0.0   | 0                         | 0.0 ±0.0   | 0            | 0.0 ±0.0   | 0            | -                     |
| Overall Mean:                | -0.8       |                           | -0.6       |              | -0.2       |              |                       |

<sup>1</sup> Ratings: “Definite Concern” (-2); “Some Concern” (-1); “No Concern” (0); “Some Benefit” (+1), or “Definite Benefit” (+2).

Statistical comparisons: <sup>a</sup> dogs vs. cats, <sup>b</sup> ferrets vs. dogs, <sup>c</sup> ferrets vs. cats

sem: standard error of the mean; ns: nonsignificant.



**(Figure 3):** “Existence of incidents” (impact) on agriculture from unconfined dogs, cats, ferrets (a) United States, Canada, and (b) California counties – Agriculture (Ag) agencies only. Rating mean  $\pm$  standard error of the mean (sem). Asterisk represents significant difference; \* p < 0.05, and \*\* p < 0.01.



**Table 2:** “Degree of concern” regarding the impact of unconfined animals on agriculture – Ag agencies only

| Effects on Agriculture                     | Dogs       |                           | Cats       |              | Ferrets    |              | p-value                                 |
|--------------------------------------------|------------|---------------------------|------------|--------------|------------|--------------|-----------------------------------------|
|                                            | Mean ± sem | <sup>1</sup> Rating Range | Mean ± sem | Rating Range | Mean ± sem | Rating Range |                                         |
| United States, DC and Canada – Ag agencies |            |                           |            |              |            |              |                                         |
| Cattle                                     | -1.6 ±0.2  | (-2)-(-1)                 | -0.3 ±0.3  | (-1)-0       | 0.0 ±0.0   | 0            | <sup>a</sup> p<0.05<br><sup>bc</sup> ns |
| Swine                                      | -0.8 ±0.5  | (-2)-0                    | -0.3 ±0.3  | (-1)-0       | 0.0 ±0.0   | 0            | <sup>abc</sup> ns                       |
| Poultry                                    | -1.5 ±0.5  | (-2)-0                    | -1.0 ±0.0  | -1           | -0.5 ±0.5  | (-1)-0       | <sup>abc</sup> ns                       |
| Fisheries                                  | -0.7 ±0.3  | (-1)-0                    | -0.5 ±0.5  | (-1)-0       | -0.5 ±0.5  | (-1)-0       | <sup>abc</sup> ns                       |
| Rabbits                                    | -0.8 ±0.3  | (-1)-0                    | -0.8 ±0.3  | (-1)-0       | 0.0 ±0.0   | 0            | <sup>abc</sup> ns                       |
| Crops                                      | -0.5 ±0.3  | (-1)-0                    | -0.5 ±0.3  | (-1)-0       | 0.0 ±0.0   | 0            | <sup>abc</sup> ns                       |
| Other (Sheep)                              | -2.0       | -2                        | -          | 0            | -          | 0            | -                                       |
| Overall Mean:                              | -1.1       |                           | -0.6       |              | -0.2       |              |                                         |
| California counties – Ag agencies          |            |                           |            |              |            |              |                                         |
| Cattle                                     | -1.3 ±0.5  | (-2)-0                    | 0.0 ±0.0   | 0            | 0.0 ±0.0   | 0            | <sup>a</sup> ns                         |
| Swine                                      | -0.7 ±0.7  | (-2)-0                    | 0.0 ±0.0   | 0            | 0.0 ±0.0   | 0            | <sup>b</sup> ns                         |
| Poultry                                    | -0.3 ±0.3  | (-1)-0                    | -0.7 ±0.3  | (-1)-0       | 0.0 ±0.0   | 0            | <sup>abc</sup> ns                       |
| Fisheries                                  | 0.0 ±0.0   | 0                         | 0.0 ±0.0   | 0            | 0.0 ±0.0   | 0            | -                                       |
| Rabbits                                    | 0.0 ±0.0   | 0                         | -0.5 ±0.5  | (-1)-0       | 0.0 ±0.0   | 0            | <sup>ac</sup> ns                        |
| Crops                                      | 0.0 ±0.0   | 0                         | 0.0 ±0.0   | 0            | 0.0 ±0.0   | 0            | -                                       |
| Other (Sheep)                              | 0.0        | 0                         | 0.0 ±0.0   | 0            | 0.0        | 0            | -                                       |
| Overall Mean:                              | -0.3       |                           | -0.2       |              | 0.0        |              |                                         |

<sup>1</sup> Ratings: “Definite Concern” (-2); “Some Concern” (-1); “No Concern” (0); “Some Benefit” (+1), or “Definite Benefit” (+2).

Statistical comparisons: <sup>a</sup> dogs vs. cats, <sup>b</sup> ferrets vs. dogs, <sup>c</sup> ferrets vs. cats; NB: P-values were not computed for comparisons when both values of sem = 0.0.

Ag (Agriculture); sem: standard error of the mean; ns: nonsignificant.

incidents” of unconfined domestic carnivores. Similar to Table 1, the overall means show that unconfined dogs caused the greatest “degree of concern,” followed by cats. Ferrets caused the least concern (overall means: dogs: -1.1; cats -0.6; ferrets -0.2). The overall means for the CA Ag agencies suggest “no concerns” for ferrets (0.0), and “little concern” for dogs (-0.3) and cats (-0.2); unconfined dogs caused the greatest “degree of concern” for “Cattle,” “Poultry,” “Swine,” and “Sheep” and unconfined cats ranked highest for “Poultry” and “Rabbits.”

## Discussion

This is the first survey to our knowledge to evaluate the relative impact of unconfined dogs, cats, and ferrets on North American agriculture, exploring not only the impact on livestock but also on fisheries and crops. Prior studies, most of which were “grey literature” (government reports and position papers, and meeting presentations), were limited in scope, describing either the general impact of unconfined carnivores, or the impact of a specific carnivore species. Even so, our survey has both strengths and some weaknesses. A strength of the survey instrument includes the use of discrete ratings in addition to narratives, allowing participants to provide both categorical and subjective responses. Respondents represent a broad range of government agencies with similar roles and backgrounds within their respective agencies, producing a level of uniformity across jurisdictions. Also, the number of nonresponders is relatively small [39, 40]. Potential limitations are attributable to issues common to most surveys: inherent inaccuracies of retrospective reporting (“recall error”); intra-observer variation due to individual bias or experience;

potential bias due to local laws, regulation and policies; and lack of documentation from respondents in support of their ratings [41, 42]. The potential for animal misidentification is also a possibility. Confusion in dog sightings could have arisen from sightings of wild canids, such as coyotes and wolves [43], or for cats, in sightings of bobcats, or in colder regions, lynx [44]. A reported “ferret sighting” near Fisheries, is refuted by an Oregon agency, writing: “... someone saw American River Otters or American Mink and mistook them for ferrets, which are not aquatic in nature.” Other wild North American mustelids include weasels, martens, fishers, and the endangered wild native Black-footed Ferret; although, confusion with the latter species is highly improbable due its extreme rarity and limited range [45].

The survey results are generally consistent across reporting jurisdictions and agencies. No significant differences are noted between the ratings from Ag agencies and those of their non-agriculture counterparts from the same jurisdiction. Unconfined dogs and cats are observed in a variety of agricultural settings across the North American continent. Sightings of unconfined dog are cause for the greatest “degree of concern,” with dogs having the greatest negative impact on livestock, which is consistent with prior reports. Under “Special Concerns,” Wyoming and Texas call out “feral” dogs as causing depredation threats and harassment to livestock. An Ag respondent who rated dogs as having equal impact for both cattle and sheep, comments: “Under Wyoming Law, feral dogs and cats are allowed to be taken on sight by any legal means. If dogs are harassing or killing livestock they may be shot on sight.” A Texas agency comments that unconfined dogs

are the second most common predators to cattle, goats, and sheep, following wild canids, such as coyotes, as the primary predators to livestock, reflecting previous reports from the state.

Under (“Special Concerns”), unconfined cats receive the majority of narrative comments. Many agencies cite difficulties in managing unconfined (“feral”) cat populations in their respective jurisdictions, describing the negative impact of feral cats on other species. For example, Rhode Island writes, “Feral cats are becoming a large problem. Due to their semi-domestic nature, people have a lot of contact with them. We have had a couple of cases of rabies in these animals, and because people can handle some of them and often feed them, they are viewed as a high-risk population of animals for rabies from a public health viewpoint.” Connecticut describes “over population by feral cats–rabies found in feral cats.” Florida states: “We treat a number of people for rabies who have fed or handled feral cats.”

Notably absent are sightings of unconfined ferrets. No state or provincial agency reports incidents from ferrets and, despite the state’s official position that damage from unconfined ferrets is “well-documented,” none of the California county agencies report ferret sightings, recording them as “historical” or “never.” All agencies rank “existence of incidents” from ferrets as “probably does not exist” or “definitely does not exist.” Furthermore, the CA county agencies rank the presence of ferrets in rural and agricultural areas at the lowest “degree of concern,” with county Ag agencies rating ferrets of “no concern” to agriculture. In particular, the CA counties report “no concern” regarding the impact of ferrets on either “Poultry” and “Rabbits,” two agricultural species that the state considers to be prey for “feral ferrets.”

Though not a specific focus of the SeaSearch survey, several agencies chose the “Special Concerns” narrative to describe the potential for unvaccinated carnivores to transmit zoonotic diseases. New Hampshire reports: “Bites by all three species occur and pose a risk to rabies, injuries, and bite-related bacterial infections. This is a greater concern in stray and feral animals than in owned animals due to the difficulty in capturing [the animal] to monitor for signs of disease and decreased likelihood [that the] animal was vaccinated.” Wisconsin states that unconfined animals pose a “...safety threat to general public and staff. Stray and feral animals can be harmful to wildlife populations, habitats, and other natural resource concerns such as disease.”

Responding agencies mention a multitude of factors complicating their management of agricultural resources with regard to unconfined domestic carnivores. Not the least of which are the wide variability and the local nature of regulatory oversight, as well as changing public attitudes. In 1994, Green and Gipson reviewed the regulatory status, writing: “Many states, particularly those in the west, permit individuals to shoot dogs that are chasing or killing game animals or livestock. State agencies or agriculture departments usually are responsible for controlling feral dogs in rural areas.

No states consider feral dogs to be game animals. Most cities have animal control agents to pick up abandoned and free-ranging domestic dogs [46].” At present, many jurisdictions, such as Virginia, have passed laws to curtail the aggressive behavior of unconfined dogs [47].

In our survey there were no agency reports that unconfined dogs, cats, or ferrets do- or would provide “some benefit” or “definitely a benefit” with respect to agriculture. Regardless, the merits of the “barn cat” and “farm dog” are being hotly debated across the continent. Proponents argue for the use of these animals in the agricultural setting and for them to remain free-roaming in order to perform their respective beneficial roles. Some jurisdictions are now implementing programs to promote the care and management of unconfined dogs and cats. Humane organizations are promulgating policies that promote the use of free-roaming cat populations both in urban, as well as agricultural settings [48, 49].

Healthcare programs are also being promoted by “barn cat” societies, addressing the need for immunizations, spay/neuter, flea and tick treatments, at no direct cost to individuals. In Europe, similar sentiments have led to the creation of the CALLISTO Project [Companion Animals multisectorial Interprofessional Interdisciplinary Strategic Think tank On zoonoses], with goals to promote a healthy balance of the benefits and risks to people and livestock when companion animals are maintained with livestock, and to develop recommendations to control the spread of zoonotic illnesses among companion animals, livestock, and humans [50]. Similar education of North American farmers is still needed. A 2018 survey of Ohio livestock owners revealed a lack of awareness and concern regarding the potential for zoonotic spread of disease between livestock and working dogs, or between working animals and their human counterparts [51].

Arguments for and against the use of free-roaming domestic carnivores in the agricultural setting are neither novel nor constrained to a particular geographical region. As the human population increases, the need for greater food production also grows, commensurate with the global expansion of agriculture. This increasing use of the planet by humans has resulted in the reduction of the natural habitats of wild carnivores, as well as the habitats of their prey. The negative impact of agriculture on carnivore species is succinctly summarized by Baker, et al.: “...the present status of many carnivores is intimately linked to historical and ongoing conflicts with humans concerning food production.” These authors further argue that domestic cats and dogs, in particular, have ultimately benefited from human activities, many times at the expense of their wild counterparts.

In summary, this survey of government agencies of the US and Canada reports on the relative impact of unconfined domestic dogs, cats, and ferrets in agricultural settings. Results confirm frequent sightings of unconfined dogs and cats throughout North America, and the demonstrable negative impact of these two species on livestock and, in some cases, crops. In contrast, there are no reports of recent sightings of domestic ferrets

in agricultural settings, with most agencies considering such reports of historical interest, or a misidentification of local wild mustelids. No jurisdiction, including the county agencies of California, a state in which ferret ownership is currently banned, report on any ferret incidents or impact on agriculture. Although none of the government agencies surveyed report that agriculture “benefited” from unconfined domestic carnivores, ongoing efforts continue based on public sentiment to develop programs for managing unconfined dogs and, in particular, cats, in North American agricultural settings.

## Acknowledgments

SeaSearch Biological Surveys is a privately-owned consultancy that selects and funds its own research for scientific purposes. SeaSearch wishes to thank C. Sinclair for assistance in preparing this document and its editorial review.

## Conflicts of Interest

The authors declare no conflict of interest.

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**Citation:** Lepe A, Kaplan V, Arreaza A, Szpanderfer R, Bristol D, et al. (2020) Impact of Free-Roaming Domestic Carnivores on North American Agriculture: a Survey of Government Agencies. *Vet Sci Med* 1: 001-009.

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The following Supplemental Tables represent the data upon which Figures 2 and 3 are based.

**Table S1:** “Existence of incidents” (impact) on agriculture from unconfined dogs, cats, ferrets (all agencies)

| Effects on Agriculture   | Dogs       |              | Cats       |              | Ferrets    |              | p-value                                                        |
|--------------------------|------------|--------------|------------|--------------|------------|--------------|----------------------------------------------------------------|
|                          | Mean ± sem | Rating Range | Mean ± sem | Rating Range | Mean ± sem | Rating Range |                                                                |
| United States and Canada |            |              |            |              |            |              |                                                                |
| Cattle                   | 3.1 ±0.4   | 1-4          | 2.1 ±0.6   | 0-4          | 0.6±0.2    | 0-1          | <sup>a</sup> ns<br><sup>b</sup> p<0.001                        |
| Swine                    | 2.1 ±0.6   | 1-4          | 2.1 ±0.6   | 0-4          | 0.4 ±0.2   | 0-1          | <sup>a</sup> ns<br><sup>b</sup> p<0.05                         |
| Poultry                  | 2.3 ±0.6   | 0-4          | 2.3 ±0.6   | 0-4          | 0.6 ±0.2   | 0-1          | <sup>a</sup> ns<br><sup>b</sup> p<0.05                         |
| Fisheries                | 1.1 ±0.1   | 1-2          | 0.9 ±0.13  | 0-1          | 0.7 ±0.2   | 0-1          | <sup>abc</sup> ns                                              |
| Rabbits                  | 1.4 ±0.4   | 1-4          | 1.7 ±0.6   | 0-4          | 0.5 ±0.2   | 0-1          | <sup>a</sup> ns<br><sup>b</sup> p<0.05                         |
| Crops                    | 1.4 ±0.4   | 1-4          | 1.3 ±0.5   | 0-4          | 0.5 ±0.2   | 0-1          | <sup>a</sup> ns<br><sup>b</sup> p<0.05                         |
| Other (Sheep)            | 4.0        | 4            | 1.0        | 1            | 0.5 ±0.5   | 0-1          | -                                                              |
| Overall Mean:            | <b>2.2</b> |              | <b>1.6</b> |              | <b>0.5</b> |              |                                                                |
| California Counties      |            |              |            |              |            |              |                                                                |
| Cattle                   | 2.3 ±0.3   | 0-4          | 1.8 ±0.4   | 0-4          | 0.4 ±0.1   | 0-1          | <sup>a</sup> ns<br><sup>b</sup> p<0.001<br><sup>c</sup> p<0.01 |
| Swine                    | 1.5 ±0.4   | 0-4          | 1.1 ±0.4   | 0-4          | 0.5 ±0.2   | 0-2          | <sup>a</sup> ns<br><sup>b</sup> p<0.05                         |
| Poultry                  | 2.2 ±0.3   | 0-4          | 1.9 ±0.4   | 0-4          | 0.5 ±0.2   | 0-2          | <sup>a</sup> ns<br><sup>b</sup> p<0.001<br><sup>c</sup> p<0.05 |
| Fisheries                | 0.3 ±0.1   | 0-1          | 0.5 ±0.2   | 0-2          | 0.4±0.1    | 0-1          | <sup>abc</sup> ns                                              |
| Rabbits                  | 1.7 ±0.4   | 0-4          | 0.9 ±0.3   | 0-4          | 0.3±0.1    | 0-1          | <sup>a</sup> ns<br><sup>b</sup> p<0.01                         |
| Crops                    | 0.6±0.2    | 0-2          | 1.1±0.4    | 0-4          | 0.4 ±0.2   | 0-2          | <sup>abc</sup> ns                                              |
| Other (Sheep)            | 0.0        | 0            | 0.5 ±0.5   | 0-1          | 0.0 ±0.0   | 0            | -                                                              |
| Overall Mean:            | <b>1.2</b> |              | <b>1.1</b> |              | <b>0.3</b> |              |                                                                |

Rating scale: 0= Definitely does not exist, 1= Probably does not exist, 2= Reported to exist, 3= Previously existed, does not exist now, 4 Definitely exist now; Statistical comparisons: <sup>a</sup> dogs vs. cats, <sup>b</sup> ferrets vs. dogs, <sup>c</sup> ferrets vs. cats; sem: standard error of the mean; ns: nonsignificant.

**Table S2:** “Existence of incidents” (impact) on agriculture from unconfined dogs, cats, ferrets (Ag agencies)

| Effects on Agriculture   | Dogs       |              | Cats       |              | Ferrets    |              | p-value                                |
|--------------------------|------------|--------------|------------|--------------|------------|--------------|----------------------------------------|
|                          | Mean ± sem | Rating Range | Mean ± sem | Rating Range | Mean ± sem | Rating Range |                                        |
| United States and Canada |            |              |            |              |            |              |                                        |
| Cattle                   | 2.8 ±0.5   | 1-4          | 1.5 ±0.6   | 0-4          | 0.5 ±0.2   | 0-1          | <sup>a</sup> ns<br><sup>b</sup> p<0.01 |
| Swine                    | 2.0 ±0.6   | 1-4          | 1.5 ±0.6   | 0-4          | 0.3 ±0.2   | 0-1          | <sup>a</sup> ns<br><sup>b</sup> p<0.05 |
| Poultry                  | 1.7 ±0.6   | 0-4          | 1.7 ±0.6   | 0-4          | 0.5 ±0.2   | 0-1          | <sup>abc</sup> ns                      |
| Fisheries                | 1.2 ±0.2   | 1-2          | 0.8 ±0.2   | 0-1          | 0.7 ±0.2   | 0-1          | <sup>abc</sup> ns                      |
| Rabbits                  | 1.5 ±0.5   | 1-4          | 1.3 ±0.6   | 0-4          | 0.5 ±0.2   | 0-1          | <sup>abc</sup> ns                      |
| Crops                    | 1.5 ±0.5   | 1-4          | 1.3 ±0.6   | 0-4          | 0.5 ±0.2   | 0-1          | <sup>abc</sup> ns                      |
| Other (Sheep)            | 4.0        | 4            | 1.0        | 1            | 0.5 ±0.5   | 0-1          | -                                      |
| Overall Mean             | 2.1        |              | 1.3        |              | 0.5        |              |                                        |
| California Counties      |            |              |            |              |            |              |                                        |
| Cattle                   | 2.7 ±0.7   | 2-4          | 1.3 ±0.3   | 1-2          | 0.3 ±0.3   | 0-1          | <sup>abc</sup> ns                      |
| Swine                    | 0.7 ±0.3   | 0-1          | 1.0 ±0.0   | 1            | 1.0 ±0.6   | 0-2          | <sup>abc</sup> ns                      |
| Poultry                  | 1.3 ±0.3   | 1-2          | 2.3 ±0.9   | 1-4          | 1.3 ±0.3   | 1-2          | <sup>abc</sup> ns                      |
| Fisheries                | 0.3 ±0.3   | 0-1          | 0.3 ±0.3   | 0-1          | 0.3 ±0.3   | 0-1          | <sup>abc</sup> ns                      |
| Rabbits                  | 0.7 ±0.3   | 0-1          | 1.0 ±0.6   | 0-2          | 0.3 ±0.3   | 0-1          | <sup>abc</sup> ns                      |
| Crops                    | 1.0 ±0.6   | 0-2          | 0.7 ±0.3   | 0-1          | 0.3 ±0.3   | 0-1          | <sup>abc</sup> ns                      |
| Other (Sheep)            | 0.0        | 0            | 0.0        | 0            | 0.0        | 0            | -                                      |
| Overall Mean             | 1.0        |              | 1.0        |              | 0.5        |              |                                        |

Rating scale: 0= Definitely does not exist, 1= Probably does not exist, 2= Reported to exist, 3= Previously existed, does not exist now, 4 Definitely exist now; Statistical comparisons: <sup>a</sup> dogs vs. cats, <sup>b</sup> ferrets vs. dogs, <sup>c</sup> ferrets vs. cats; sem: standard error of the mean; ns: nonsignificant

From: Sandra Losito <[REDACTED]>

Sent: Monday, May 5, 2025 2:20 PM

To: FGC <FGC@fgc.ca.gov>

Subject: Please Support Petition 2025-003

Ferrets are not wild, not detrimental, and have never had a hearing. I am adding my voice to those asking you to support Petition 2025-003.

Sandra Losito



**From:** [REDACTED]

**Sent:** Thursday, May 15, 2025 11:56 AM

**To:** FGC <FGC@fgc.ca.gov>

**Subject:** Support for the Petition to Reclassify Domestic Ferrets in California

Dear California Fish and Game Commission,

I am writing to express my strong support for Petition 2025-03, which seeks to reclassify domestic ferrets as legal companion animals in the state of California.

Ferrets are intelligent, playful, and affectionate creatures that have brought joy and companionship to families across the country. In nearly every other state, ferrets are recognized and embraced as loving pets—much like cats and dogs. California's continued ban not only deprives responsible pet owners of the opportunity to care for these wonderful animals, but also leads to unnecessary fear, confusion, and the potential for surrendered ferrets to be confiscated or euthanized.

Domestic ferrets are not wild animals. They have been bred for generations to live in homes and depend on humans for their survival. Like any pet, they thrive when treated with love, respect, and proper care. With thoughtful regulation and education—not prohibition—California can ensure ferret ownership is handled responsibly.

I believe ferrets deserve the chance to be legally welcomed into California homes where they can be cherished and cared for. Please consider the voices of those who see them for what they truly are: sweet, social companions with so much love to give.

Thank you for your time and consideration.

Sincerely,

Chelsea Cook

[REDACTED]

From: Johnny Morfin [REDACTED]

Sent: Monday, May 5, 2025 1:25 AM

To: FGC <FGC@fgc.ca.gov>

Subject:

Please Legalize Ferrets – Petition 2025-003

Hi there,

I just wanted to say I support Petition 2025-003 to make ferrets legal in California. I've always thought it was strange we can't have them here when most other states allow them. They're not wild animals—they're pets, and people just want to give them good homes.

I live in Victorville, and I know a lot of people around here who would love the chance to own a ferret. I'm really hoping you'll take this seriously and give us a chance to enjoy these animals legally like the rest of the country.

Thanks for listening.

From: Bryan Murcia <[REDACTED]>

Sent: Tuesday, May 20, 2025 02:28 PM

To: FGC <FGC@fgc.ca.gov>

Subject: Support for Petition 2025-003

To the Esteemed Members of the California Department of Fish and Game,

I am writing to respectfully urge your consideration for the legalization of domestic ferrets as pets in the state of California. The current prohibition, which sets California apart from the majority of other U.S. states and many developed nations, is based on concerns that, upon closer examination, are largely outdated and do not fully reflect the reality of responsible ferret ownership and modern scientific understanding.

One of the primary arguments against ferret ownership in California has been the perceived threat they pose to native ecosystems if they were to escape into the wild. While the impact of European ferrets in isolated environments like New Zealand is often cited, this comparison is largely inapplicable to California's diverse and complex environment. Domestic ferrets are highly dependent on humans for survival, typically spayed or neutered, descented, and bred for docility. These characteristics make them ill-equipped to hunt effectively or establish self-sustaining populations in the wild. Furthermore, California's existing predator populations and varied climate would likely prevent escaped ferrets from thriving in the same manner as their wild counterparts in different ecosystems. The risk of domesticated ferrets becoming an invasive species is significantly lower than often portrayed, especially when considering the documented impact of other legally owned domestic animals, such as cats, on wildlife.

Another historical concern has been the potential for ferrets to transmit rabies. However, this concern is effectively mitigated by the availability of a USDA-approved rabies vaccine specifically for ferrets. In states where ferrets are legal, mandatory vaccination programs have proven highly effective in preventing rabies transmission. The Centers for Disease Control and Prevention (CDC) has recorded very few cases of rabies in ferrets, predominantly in unvaccinated animals exposed to rabid wildlife. With proper veterinary care and adherence to vaccination protocols, the risk of rabies transmission from ferrets is no greater than from other legally owned domestic animals like dogs and cats. Implementing a similar mandatory vaccination requirement in California would effectively address this public health concern.

Beyond addressing these historical objections, the legalization of ferrets offers numerous benefits. Ferrets are intelligent, playful, and affectionate companions that form strong bonds with their owners. Their relatively small size and ability to be litter-trained make

them suitable pets for various living situations, including apartments, appealing to a broad demographic of pet enthusiasts. Moreover, allowing responsible ferret ownership could contribute positively to the state's economy through increased demand for veterinary services, pet supplies, and regulated breeding programs. The current ban inadvertently leads to a lack of proper veterinary care for existing ferret populations, unregulated breeding, and an inability to track or manage these animals within the state. Legalization would bring ferret ownership into a regulated framework, enabling better oversight, health monitoring, and public education regarding responsible pet care.

In conclusion, the arguments against legalizing ferrets in California are largely based on outdated information and exaggerated fears. Modern scientific understanding, coupled with successful regulatory frameworks in other states, clearly demonstrates that ferrets can be safely and responsibly integrated into the pet population. By legalizing ferrets, California would not only align its animal welfare policies with current realities and evidence-based practices but also empower its citizens to enjoy the companionship of these unique and beloved creatures under appropriate and well-enforced regulations.

We respectfully request that the California Department of Fish and Game reconsider its stance on domestic ferret ownership and initiate steps towards their legalization.

Thank you for your time and consideration of this important matter,

Bryan Murcia

**From:** Kyle Klepach <[REDACTED]>

**Sent:** Tuesday, April 15, 2025 10:45 AM

**To:** FGC <FGC@fgc.ca.gov>

**Subject:** Please Support Petition 2025-003

Hello, I am adding my voice to those asking you to support Petition 2025-003.

Ferrets are not wild animals, they are domesticated and dependent on their human owners. A ferret would not survive in the wild as they have a dependency on foods they were raised on, and would have a low survival instinct since they are housepets.

As far as a wild population would be concerned, ferrets procured from pet stores do not have the ability to breed in the wild (they are all spayed/neutered) - hence why approval and support for ferrets would result in future owners sourcing their ferrets from pet stores & rescues that have these fixed ferrets available (cutting down on backyard breeders, etc.).

They would not be detrimental to the natural environment; As stated before, ferrets are dependant on the diets they are raised on, and would refuse foods not accustomed to them - leaning into that their domestication decreases their survivability in the wild, resulting in practically no feral populations unlike other domesticated animals (cats for instance hold much more of a predatory instinct and have the ability to survive independently, have feral populations and would be considered more detrimental).

I feel that ferrets should have a hearing to weigh these points among others to allow them to be legalised as other states have shown no issues with populations of feral domesticated ferrets.

Thank you for reading and listening!

**From:** S.B.M. van Voorn <[REDACTED]>

**Sent:** Tuesday, April 29, 2025 12:11 PM

**To:** FGC <FGC@fgc.ca.gov>

**Subject:** Ferret legalization

Good day,

while respecting your work, we would nevertheless like to let you know that more and more people, who generally deal with ferrets, are puzzled by the measures taken by you based on incorrect data from 1933 for this harmless pet.

Our question to you is whether you would like to pay attention to this and revise the outdated California legislation, both in your own interest and that of the pet ferret.

Please consider and evaluate this legislation from almost a century ago

Kind regards,

Sabine van Voorn and Han de Vries,

World Ferret Union and World Ferret Information Centre.

<https://www.wfu-wfic.org/>



From: Carol J Owens <[REDACTED]>

Sent: Sunday, April 27, 2025 7:54 PM

To: FGC <FGC@fgc.ca.gov>

Subject: I support petition 2025-003 - classifying domestic ferrets as domestic

Please add my voice to those who support the proper classification of domestic ferrets as domestic animals. I have had many ferrets in my life and had a ferret shelter while living near Tucson. I have since moved back to my roots in Wisconsin but really miss the ferrets. I live in a senior residence where we can have cats and small dogs but ferrets wouldn't be welcome with the carpeted floor. Aside from that they are awesome pets, generally friendly unless mistreated.,I took in many in my sheltering days (10 years) and my heart went out to get some that were mistreated. More shelters are needed to give out the proper care of ferrets.

Carol J Owens, [REDACTED]

[REDACTED]

Please Support Petition 2025- 003

Hello I am writing in support of Petition 2025-003. Ferrets should be legal in the state of California for many reasons.

To begin, the vast majority of these pets are bred through one commercial breeder who sells them at pet stores in every other contiguous state. They are widely known as domestic pets, even on the USDA government website.

Second, as domestic pets sold through pet stores, they have well known medical conditions rampant in their population. These include adrenal disease and insulinoma which are easily treated with appropriate veterinary care. Because these domestic pets are illegal in California, they are not getting the health care they need.

Pet owners are afraid to call a veterinarian for fear of their beloved pet being confiscated. Veterinarians are untrained and unable to help in many cases. This is not the case in every other contiguous state. It's cruel and unreasonable to deny these pets the vet care they need.

Ferrets are not wild, not detrimental, and have never had a hearing. In 48 states they are pets who need pet care. The study "Impacts of domesticated ferrets upon wildlife, agriculture, and human health in the USA, compiled from state agency surveys and literature review, with special emphasis upon California" posted on your government website states "California has the largest populations of pet ferrets in the USA."

As someone who has worked in the veterinary industry for 8 years in the state of California, I can say with great confidence you are doing a huge disservice to a pet so clearly here and so clearly domesticated.

In addition, in the study "Environmental Impact and Relative Invasiveness of Free-Roaming Domestic Carnivores—a North American Survey of Governmental Agencies" "no agency reported that ferrets caused environmental harm." The study also points to "cats being the major offenders" having an "impact on native wildlife". If cats have a bigger impact and are legal, then ferrets should be legal too.

Please overturn the ferret ban and legalize ferrets in the state of California. It's the right thing to do.

Thank you for your consideration!



## California Fish and Game Commission

### New Petitions for Regulation Change: Received by 5:00 PM on May 29, 2025

CFGF - California Fish and Game Commission CDFW - California Department of Fish and Wildlife WRC - Wildlife Resources Committee MRC - Marine Resources Committee

| Tracking No. | Date Received | Name of Petitioner                             | Short Description                                   | FGC Receipt Scheduled | FGC Action Scheduled |
|--------------|---------------|------------------------------------------------|-----------------------------------------------------|-----------------------|----------------------|
| 2025-04      | 4/15/2025     | David Bess,<br>Backcountry Hunters and Anglers | Request to allow the purchase of a second bear tag. | 6/11-12/2025          | 8/13-14/2025         |



Tracking Number: ( 2025-04)

To request a change to regulations under the authority of the California Fish and Game Commission (Commission), you are required to submit this completed form to: California Fish and Game Commission, (physical address) 1416 Ninth Street, Suite 1320, Sacramento, CA 95814, (mailing address) P.O. Box 944209, Sacramento, CA 94244-2090 or via email to FGC@fgc.ca.gov. Note: This form is not intended for listing petitions for threatened or endangered species (see Section 670.1 of Title 14).

Incomplete forms will not be accepted. A petition is incomplete if it is not submitted on this form or fails to contain necessary information in each of the required categories listed on this form (Section I). A petition will be rejected if it does not pertain to issues under the Commission's authority. A petition may be denied if any petition requesting a functionally equivalent regulation change was considered within the previous 12 months and no information or data is being submitted beyond what was previously submitted. If you need help with this form, please contact Commission staff at (916) 653-4899 or FGC@fgc.ca.gov.

## **SECTION I: Required Information.**

*Please be succinct. Responses for Section I should not exceed five pages*

### **1. Person or organization requesting the change (Required)**

Name of primary contact person: David Bess

Backcountry Hunters and Anglers Legislative/Regulatory Chair

Address:

Telephone number:

Email address:

### **2. Rulemaking Authority (Required) - Reference to the statutory or constitutional authority of the Commission to take the action requested: California Fish and Game Code Section 200**

### **3. Overview (Required) - Summarize the proposed changes to regulations:**

Adding a second bear tag to Cal. Code Regs. Tit. 14, § 708.12 - Bear License Tags. New language added in blue.

## **Cal. Code Regs. Tit. 14, § 708.12 - Bear License Tags**

### **(a) Bear License Tags:**

(1) With the exception of permits and tags issued pursuant to section 4181 of the Fish and Game Code, all bear license tags shall be available to the public through the department's Automated License Data System terminals at any department license agent or department license sales office.

(2) The department shall require that the specified fee provided for in section 4751 of the Fish and Game Code for such bear license tags be paid as a prerequisite to obtaining a bear license tag.

(3) The department shall charge a nonrefundable processing fee, as specified in Section [702](#), for each bear license tag.

(4) ~~Applicants may purchase only one bear license tag during any one license year. Any person who purchases more than one bear license tag may be denied bear license tags for the current license year.~~ Applicants may



**purchase only two bear license tags during any one license year. Any person who purchases more than two bear license tags may be denied bear license tags for the current license year.**

(5) Upon the killing of any bear, that person shall immediately fill out all portions of the tag including the report card completely, legibly, and permanently, and cut out or punch out and completely remove notches or punch holes for the month and date of the kill. The bear license tag shall be attached to the ear of the bear and kept attached during the open season and for 15 days thereafter.

**4. Rationale (Required) - Describe the problem and the reason for the proposed change:**

**RESOLUTION DECLARING SUPPORT FOR SCIENCE-BASED MANAGEMENT OF CALIFORNIA’S BLACK BEAR POPULATION AND A SECOND BEAR TAG**

WHEREAS pursuant to the Black Bear Conservation Plan published by the California Department of Fish & Wildlife (CDFW), “black bears are widespread and common throughout most forested habitats of California; they are one of the most commonly occurring large mammal species in California forests;” (California Department of Fish & Wildlife. (2025). Black bear Management Plan. State of California. p. 30); and

WHEREAS “common species, such as black bears in California, have substantial effects on the broader ecological community such that the conservation of common species should be considered alongside concerns about rare species (Gaston and Fuller 2007)” (California Department of Fish and Wildlife, 2025, p. 19); and

WHEREAS “within California, Monteith et al. (2014) found neonate mule deer (*Odocoileus hemionus*) born west of the Sierra Crest, where black bear densities are higher than east of the Sierra crest, were >6 times more likely to die of black bear predation than any other cause. High rates of black bear predation were thought to limit deer abundance in this area by causing a reduction in the proportion of deer that migrate to summer range, as deer trade off obtaining superior nutritional benefits to avoid predation (Monteith et al. 2014). Black bear predation is also a common cause of mortality for black-tailed deer (*Odocoileus hemionus columbianus*) fawns in the Mendocino National Forest (Wittmer et al. 2014)” (California Department of Fish and Wildlife, 2025, p. 30); and

WHEREAS “within the Mendocino National Forest, black bears frequently displace mountain lions from their kills, a behavior called kleptoparasitism. Elbroch et al. (2015) found black bears at 77% of mountain lion kills, and black bears displaced mountain lions from them 72% of the time. Black bear kleptoparasitism caused mountain lions to increase their kill rates substantially to recoup energetic losses to black bears (Elbroch et al. 2015, Allen et al. 2021). Collectively, high rates of predation on fawns and kleptoparasitism of mountain lion kills by black bears have likely contributed to a declining deer population in this area (Wittmer et al. 2014, Marescot et al. 2015)” (California Department of Fish and Wildlife, 2025, p. 30-31); and

WHEREAS “partnerships between CDFW and hunting-focused non-governmental organizations (NGOs) play important roles in habitat creation and protection that benefit a wide variety of species. Specific to black bears, hunters also provide CDFW with tooth samples from harvested animals (over 1,000 samples annually). Age estimates from these samples constitute a key source of scientific data that is critical to efficient estimation and monitoring of black bear populations throughout California.” (California Department of Fish and Wildlife, 2025, p. 10); and



WHEREAS “Black bears are classified as a game mammal in California (FGC § 3950) such that regulated hunting of the species includes licensing, fees, harvest season and area, and other restrictions (Title 14 California Code of Regulations (CCR) § 365, 366, 367.5, FGC § 4750-4763)” (California Department of Fish and Wildlife, 2025, p.10); and

WHEREAS “Over the last 10 years (2014-2023), an average of 29,245 black bear tags were sold annually which generated \$13.3 million in revenue, ranging from \$1.0 million to \$1.7 million per year. Additionally, pursuant to the Pittman-Robertson Act of 1937, a federal tax on firearms and ammunitions sales allocates between \$10 and \$30 million per year to wildlife and wildlife habitat conservation in California. CDFW uses a portion of these funds to staff its conservation and hunting programs for black bears and other game species. For example, over the last 10 years (2014-2023), the amount of these state and federal funds that CDFW has used annually for staff, contracts, and procurement of equipment such as GPS collars has varied between \$500,000 and \$4 million.” (California Department of Fish and Wildlife, 2025, p. 27); and

WHEREAS “the maximum sustainable annual hunting mortality rate for black bears has been estimated to be as high as 15.9% (Miller 1990), although Pennsylvania, Virginia, and Wisconsin have reported increasing or stable black bear populations with harvest rates >20% (Hristienko and McDonald 2007). Based on current best estimates of black bear populations statewide and regionally, hunters harvest less than 5% annually of the bears present in any BCR of the state, and under 3% overall (see Section 4.2). This harvest rate is considerably lower than the maximum sustainable harvest rates discussed above and is also lower than recent harvest rates in nearby states such as Oregon (ODFW 2022) and Washington (WDFW 2022).” (California Department of Fish and Wildlife, 2025, p. 26-27); and

WHEREAS “black bears are culturally significant to many Native American Tribes, are a favored game species to many hunters, are sought after for viewing and photography opportunities, and are widely recognized for their intrinsic value and ecological role as an omnivorous predator. Black bears can also be a source of conflict when they use areas of high human activity (i.e., they become habituated to people), seek out anthropogenic food sources and cause property damage (i.e., they become food-conditioned), prey upon livestock, contribute to reducing ungulate populations (Monteith et al. 2014, Wittmer et al. 2014) below desired management thresholds, or threaten public safety through aggressive or predatory behavior,” and CDFW currently estimates the black bear population to be 59,851 which is more than twice the previous population estimate that was used to establish an annual harvest quota of 1700 bears. (California Department of Fish and Wildlife, 2025, p. 9)

NOW, THEREFORE, BE IT RESOLVED THAT we the undersigned individuals and organizations respectfully request the California Fish & Game Commission uphold its commitment to science-based management of fish and wildlife by utilizing the powers delegated to it by the legislature and ensure sustainable harvest of black bears according to the quota established by the California Department of Fish & Wildlife;

NOW BE IT FURTHER RESOLVED THAT, we the undersigned individuals and organizations respectfully request the California Fish & Game Commission promptly receive and refer the petition from Backcountry Hunters & Anglers to implement a second bear tag for purchase to ensure additional funding for science-based management of black bears, opportunity for fair-chase hunting, a reduction in





human-bear conflicts, balanced predator-prey ecosystem dynamics, and a healthy food source for responsible hunters and their families.

## **SECTIONII: Optional Information**

5. **Date of Petition:** 4/14/2025.

6. **Category of Proposed Change**

☐ Sport Fishing

☐ Commercial Fishing

☒ Hunting

☐ Other, please specify: Click here to enter text.

7. **The proposal is to:** *(To determine section number(s), see current year regulation booklet or <https://govt.westlaw.com/calregs>)*

☒ Amend Title 14 Section(s): Click here to enter text.

☐ Add New Title 14 Section(s): Click here to enter text.

☐ Repeal Title 14 Section(s): Click here to enter text.

8. **If the proposal is related to a previously submitted petition that was rejected, specify the tracking number of the previously submitted petition**

Or ☒ Not applicable.

9. **Effective date:** If applicable, identify the desired effective date of the regulation. If the proposed change requires immediate implementation, explain the nature of the emergency: 2025 hunting season if possible. If not, 2026..

10. **Supporting documentation:** Identify and attach to the petition any information supporting the proposal including data, reports and other documents: See recently released Black Bear Conservation Plan.

11. **Economic or Fiscal Impacts:** Identify any known impacts of the proposed regulation change on revenues to the California Department of Fish and Wildlife, individuals, businesses, jobs, other state agencies, local agencies, schools, or housing: Increase in revenue from tags sold..

12. **Forms:** If applicable, list any forms to be created, amended or repealed:

Click here to enter text.

## **SECTION 3: FGC Staff Only**

Date received: 04/15/2025

FGC staff action:



- ☒ Accept - complete
- ☐ Reject - incomplete
- ☐ Reject - outside scope of FGC authority

Tracking Number

Date petitioner was notified of receipt of petition and pending action: \_\_\_\_\_

Meeting date for FGC consideration: \_\_\_\_\_

FGC action:

- ☐ Denied by FGC
- ☐ Denied - same as petition \_\_\_\_\_
- ☐ Granted for consideration of regulation change

Tracking Number

**California Fish and Game Commission**  
**Non-Regulatory Requests for Action — Updated May 21, 2025**

CFGF - California Fish and Game Commission    CDFW - California Department of Fish and Wildlife  
WRC - Wildlife Resources Committee    MRC - Marine Resources Committee

| Date Received | Name of Requestor                                                          | Subject of Request                                               | Short Description                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Category | FGC Receipt Scheduled | FGC Initial Action Scheduled | Initial Staff Recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------|----------------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3/24/2025     | Mike Costello and Charles Whitwam, HOWL for Wildlife                       | California Endangered Species Act: Gray Wolf and Wolf Management | Requests the Commission support delisting gray wolf in California under the federal Endangered Species Act (ESA). Also requests the Commission delist gray wolf under the California Endangered Species Act (CESA), update the Department's Gray Wolf Management Plan, authorize protocols that deter wolves from preying on livestock, identify the threat that habituated wolves present to humans and ecosystems, and develop a management strategy for wolves and Tule elk. | Wildlife | 4/16-17/25            | 6/11-12/25                   | <p>ESA delisting: The Commission does not have the resources necessary to gather and evaluate the information for assessing whether to support federal delisting of gray wolf in California.</p> <p>CESA delisting: The requester has been advised that the Commission must receive a petition to delist gray wolf under CESA for the Commission to consider such action.</p> <p>Other requests: The remainder of the requests fall under Department authority; the requests have been shared with the Department. No further action recommended.</p> |
| 2/11/2025     | Steve Cole, Assistant General Manager, Santa Clarita Valley Water District | California Endangered Species Act: Southern California Steelhead | Requests Figure 7 in the 2024 Department status review report for southern California steelhead be corrected or a disclaimer added stating it should not be used for regulatory purposes; otherwise, the requestor believes confusion will persist.                                                                                                                                                                                                                             | Wildlife | 4/16-17/25            | 6/11-12/25                   | Findings adopted by the Commission for the decision to list southern California steelhead directly addresses the identified concern (see page 8). No further action recommended.                                                                                                                                                                                                                                                                                                                                                                      |
| 4/4/2025      | Mike Costello, HOWL for Wildlife                                           | California Endangered Species Act: Mountain Lion                 | Requests that the Commission request from the Department a status review report on mountain lion for CESA purposes and to act immediately to make a final listing determination.                                                                                                                                                                                                                                                                                                | Wildlife | 4/16-17/25            | 6/11-12/25                   | The Department will transmit the mountain lion status review report to the Commission when it determines the report is complete. When the Commission receives the report it will be posted for the required 30-day public review, and subsequently will be considered at the next available Commission meeting. No further action recommended.                                                                                                                                                                                                        |

**California Fish and Game Commission**  
**Wildlife Resources Committee (WRC) Work Plan Scheduled**  
**Topics and Timeline for Items Referred to WRC**  
*Updated May 16, 2025*

*Note: Proposed changes to topics/timing are shown in blue underscore or strike-out font*

| Topics                                                                                                | Category               | Jan 2025 | May 2025   | Sep 2025   |
|-------------------------------------------------------------------------------------------------------|------------------------|----------|------------|------------|
| Periodic and Annual Regulations                                                                       |                        |          |            |            |
| Upland (Resident) Game Bird <u>Hunting</u>                                                            | Regulatory             |          | X          | <u>X/R</u> |
| Big Game Hunting ( <u>Deer, Elk, Pronghorn</u><br><u>Antelope, Black Bear, Nelson Bighorn Sheep</u> ) | Regulatory             | X/R      | X          | <u>X/R</u> |
| Waterfowl Hunting                                                                                     | Annual<br>Regulatory   |          | X          | <u>X/R</u> |
| Central Valley Sport Fishing                                                                          | Annual<br>Regulatory   |          | X          | <u>X/R</u> |
| Klamath River Basin Sport Fishing                                                                     | Annual<br>Regulatory   |          | X          | <u>X/R</u> |
| Inland Sport Fishing<br>(including striped bass)                                                      | Regulatory             | X/R      |            | <u>X</u>   |
| Department Lands                                                                                      | Regulatory             |          | X          | <u>X/R</u> |
| Regulations & Legislative Mandates                                                                    |                        |          |            |            |
| Restricted Species                                                                                    | Regulatory             |          |            |            |
| Take of Coyotes                                                                                       | Referral for<br>Review | X/R      | <u>X/R</u> |            |
| Bear Hunting                                                                                          | Referral for<br>Review |          | X          | X/R        |

**KEY:**    X   Discussion scheduled    X/R   Recommendation potentially developed and moved to FGC

**From:** Richard Layne [REDACTED]  
**Sent:** Thursday, May 29, 2025 09:27 AM  
**To:** FGC <[FGC@fgc.ca.gov](mailto:FGC@fgc.ca.gov)>  
**Subject:** Hunting black bears in CA

Dear Commissioners,

I am very much against the trophy hunting of black bears. I urge you not to increase the number of bears that can be killed. I particularly urge you not to allow cruel and unsporting methods like hunting with hounds or bait or spring hunting.

I understand there are differing views on this controversial issue, but certainly we should all be able to agree that the hunting methods you authorize should not be cruel to black bears. No one should want these magnificent animals to unnecessarily suffer.

Thank you for hearing my thoughts on this .

Richard Layne  
[REDACTED]  
Sent from my iPhone

May 16, 2025

Commissioner Erika Zavaleta  
California Fish and Game Commission  
P.O. Box 944200  
Sacramento, CA 94244-2090

Commissioner Zavaleta,

I want to thank you and commissioner Anderson for having the WRC meeting on May 15th. I appreciate your efforts in making it so that everyone had an opportunity to be heard in a respectful open discussion. I arrived early that morning and was met in the hallway by the woman who apparently ran the logistics for the meeting and she was very kind in helping me finding the room. She also explained what would go on and when item number four was going to be introduced. I was also impressed by the staff member's presentation explaining the difference between code, policy, and regulation. As a retired professor, in my career, I have seldom heard such an easy to understand explanation of differences. I will keep and pass along copies of the printed Powerpoint for future reference.

I was glad to see so many fish and wildlife officers there observing what was going on. I interact with some of the wildlife officers in my area almost on a weekly basis while trying to help livestock and agricultural producers deal with their conflicts with predators, mainly coyotes. The officers are always helpful even though I know they are overstressed by the large areas they are responsible for. The wildlife biologists and environmental scientists I interact with are equally responsive, although equally stressed due to the overall lack of staffing. It's unfortunate that in a state as prosperous as California we have staffing issues which leads to less than desirable effect on the people and the wildlife of the state.

Respectfully,



Lee White





May 16, 2025

Commissioner Darius W. Anderson  
California Fish and Game Commission  
P.O. Box 944200  
Sacramento, CA 94244-2090

Commissioner Anderson,

I want to thank you and commissioner Zavaleta for having the WRC meeting on May 15th. I appreciate your efforts in making it so that everyone had an opportunity to be heard in a respectful open discussion. I arrived early that morning and was met in the hallway by the woman who apparently ran the logistics for the meeting and she was very kind in helping me finding the room. She also explained what would go on and when item number four was going to be introduced. I was also impressed by the staff member's presentation explaining the difference between code, policy, and regulation. As a retired professor, in my career, I have seldom heard such an easy to understand explanation of differences. I will keep and pass along copies of the printed Powerpoint for future reference.

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Respectfully,



Lee White





## SAN LUIS OBISPO COUNTY FARM BUREAU

4875 MORABITO PLACE, SAN LUIS OBISPO, CALIFORNIA 93401

PHONE (805) 543-3654 SLOFARMBUREAU.ORG

May 2, 2025

pel  
5/13/25

Dr. Erika Zavaleta, President  
California Fish and Game Commission  
P.O. Box 944209  
Sacramento, CA 994244-2090

**RE: Proposed Change in Status of Coyotes to Game Animals**

Dear Dr. Zavaleta and Commissioners:

Beef cattle production accounted for \$69,000,000.00 in market value for San Luis Obispo County in 2023. The largest cause of calf loss is predation by coyotes. Coyotes are great in number in our county and have few natural predators in this region. Furthermore, coyotes pose a continual threat to rural, suburban, and urban pets. Owners are often forced to keep their cats, dogs, and chickens either penned up or indoors for long periods of time due to the threat of coyote attack. And while rare, there are a growing number of incidents where humans – particularly children – have been attacked by coyotes.

Changing the classification of coyotes from nongame animals to game animals would have a grave detrimental effect on our beef and lamb producers. Because coyote depredation happens year-round, establishing a hunting season and a bag limit restricts beef and lamb producers' ability to protect newborn animals.

For these reasons, San Luis Obispo County Farm Bureau urges the California Fish and Game Commission to not place hunting or taking restrictions on coyotes and to not reclassify them as game animals.

Sincerely,

Paul E. Clark,  
Executive Director,  
San Luis Obispo County Farm Bureau

Cc: Steven Fenaroli, California Farm Bureau



# CDFW NEWS

*April 25, 2025*

## **CDFW Announces Release of Bighorn Sheep Conservation and Management Plan for California**



The California Department of Fish and Wildlife (CDFW) is pleased to present [The Conservation and Management Plan for Bighorn Sheep in California](#)(opens in new tab).

The plan identifies actions based on the latest science to conserve and manage a species that occupies some of the most extreme landscapes in California – from the highest and snowiest peaks in the Sierra Nevada mountains to the arid and hot Sonoran and Mojave deserts. It updates A Plan for Bighorn Sheep in California published in 1983.

“Bighorn sheep are an inspiring and enduring symbol of California’s rugged wilderness and independent spirit,” said CDFW Director Charlton H. Bonham.

“[These resilient](#)(opens in new tab) and resourceful animals have played an important ecological, cultural and historical role in California, yet their populations have faced significant challenges due to disease, habitat fragmentation, loss of connectivity, extreme weather events and other environmental stressors. This updated plan offers a strong foundation to manage and support this iconic species into the future.”

California is home to an estimated population of 5,400 bighorn sheep. These include some 400 Sierra Nevada bighorn, 750 Peninsular bighorn and 4,250 desert bighorn in Southern California outside of the Peninsular Ranges.

Peninsular and Sierra Nevada bighorn sheep are listed as endangered under the federal Endangered Species Act and have separate recovery plans developed in 2000 and 2007, respectively, in collaboration with the U.S Fish and Wildlife Service. Other non-endangered desert bighorn sheep populations allow for sustainable and coveted hunting opportunities.

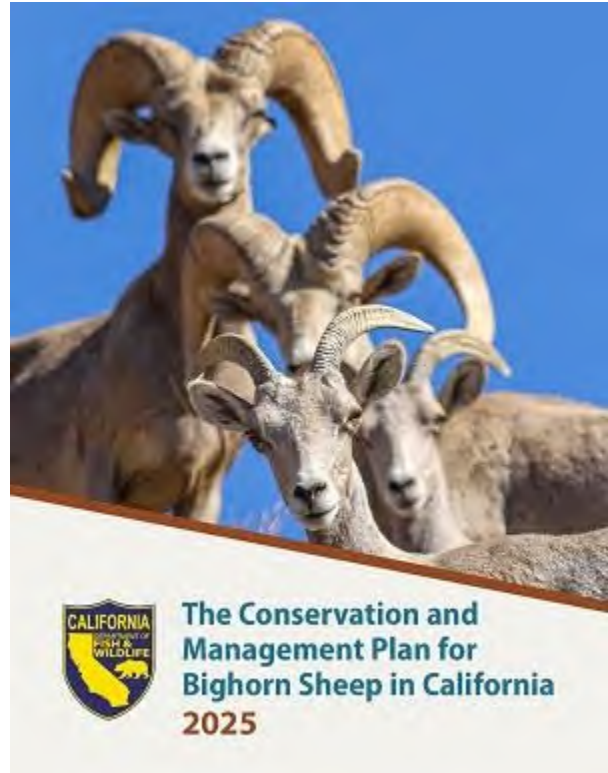
“This plan brings together traditional, ecological, and historical knowledge of bighorn sheep across California, but focuses specifically on the conservation and management goals for the non-endangered desert bighorn populations,” said Paige Prentice, CDFW’s Statewide Bighorn Sheep Coordinator.

**Media Contacts:**

[Paige Prentice](#), CDFW Wildlife Branch, (916) 268-2621

[Peter Tira](#), CDFW Communications, (916) 215-3858

###







# CDFW NEWS

*May 30, 2025*

## CDFW Seeks Public Comment on Draft Guidelines for Recovery Planning



The California Department of Fish and Wildlife (CDFW) is seeking public comment on the draft Guidelines for Recovery Planning, a document intended to guide development of effective recovery plans to recover threatened and endangered species listed under the California Endangered Species Act (CESA; Fish and Game Code section 2079.1).

CDFW has posted the draft Guidelines for Recovery Planning to CDFW's [Recovery Planning](#) web page for public review. CDFW respectfully requests comments be submitted no later than July 31, 2025. Submit written comments to CDFW by email at [CESArecovery@wildlife.ca.gov](mailto:CESArecovery@wildlife.ca.gov) and include "Guidelines for Recovery Planning" in the subject line. Comments may also be submitted by mail to California Department of Fish and Wildlife, Wildlife Branch, Attn: Austin Roy/Recovery Guidelines, P.O. Box 944209, Sacramento, CA 94244-2090.

During the comment period, CDFW will host a public meeting from 10 a.m. to 12 p.m. on Tuesday, June 17, 2025. The meeting will be held at 715 P St., Room 201, Sacramento, CA 95811. For those who would like to attend remotely over Zoom, registration for the meeting is available using this link:

[https://wildlife-ca-gov.zoom.us/webinar/register/WN\\_I4hSqGxeR8GTPoDkLgbt9Q](https://wildlife-ca-gov.zoom.us/webinar/register/WN_I4hSqGxeR8GTPoDkLgbt9Q)

Following the public comment period, information received will be reviewed and considered during development of the final guidelines. Once approved, the final Guidelines for Recovery Planning will be available on CDFW's [Recovery Planning](#) web page.

**Media Contacts:**

[Austin Roy](#), CDFW Wildlife Branch, (916) 768-0564

[Steve Gonzalez](#), CDFW Communications, (916) 804-1714

###



## Memorandum

**Date:** May 1, 2025

**To:** Melissa Miller-Henson  
Executive Director  
Fish and Game Commission

**From:** Charlton H. Bonham  
Director

**Subject:** **June 2025 Request for Changes to the Fish and Game Commission's Timetable for Anticipated Regulatory Actions**

The Department of Fish and Wildlife (Department) requests the following schedule changes to the Fish and Game Commission's (Commission's) 2025-2026 regulatory timetable for amendments to Title 14, California Code of Regulations (CCR):

1. Please add a new rulemaking, "Take of Morro Manzanita During Candidacy" adding Section 749.14, requesting to authorize notice at the June 2025 meeting, discussion at the August 2025 meeting, and adoption at the October 2025 meeting. This rulemaking was discussed at the April 2025 meeting with the finding that listing under the California Endangered Species Act is warranted. The discussion with San Luis Obispo County accounts for a shovel-ready bridge replacement project which has completed all environmental reviews, to allow for exception from the take prohibition during candidacy and the 1-year status review period.
2. Please add a new rulemaking, "Recreational Red Abalone Closure Extension" amending Section 29.15, requesting to authorize notice at the August 2025 meeting, discussion at the October meeting, and adoption at the December 2025 meeting. This rulemaking aims to extend the red abalone fishery's "sunset" date by 10 years, from April 1, 2026 to April 1, 2036. This regulation change is required to keep the fishery closed pursuant to existing population collapse, as discussed at [past Marine Resources Committee meetings](#).
3. Please add two follow-up rulemakings for the existing emergency regulation, "Commercial Coonstripe Shrimp Fishery" both of which are two 90-day re-adoption actions. The first should be at the August 13-14, 2025 meeting and the 2<sup>nd</sup> 90-day re-adoption action for the October 8-9, 2025 meeting.
4. Please add a certificate of compliance (standard rulemaking action) for the existing emergency regulation, "Commercial Coonstripe Shrimp Fishery"

amending Section 180.15. This regulation is slated for notice at the October 2025 meeting and Discussion/ Adoption at the December 2025 meeting. This rulemaking aims to make permanent changes to the coonstripe shrimp fishery as it relates to marine life entanglements.

5. Please add a new rulemaking, "Extend Bull Kelp Harvest Restriction Date," amending sections 165 and 165.5, requesting to authorize notice at the August 2025 meeting, and a discussion/ adoption at the October 2025 meeting. This rulemaking aims to extend the temporary restriction place on bull kelp harvest in the north coast currently listed as January 1, 2026. Bull kelp populations in Sonoma and Mendocino counties continue to face population declines, and thus the existing 3-year harvest restriction approved by the Commission at its October 13, 2022 meeting needs to be extended until January 1, 2029 while the Kelp Restoration Management Plan (KRMP) wraps up development.
6. Please add a new rulemaking, "Donation of Sport-Caught Fish," amending Section 231, requesting to authorize notice at the August 2025 meeting, and a discussion/ adoption at the October 2025 meeting. This rulemaking aims to amend existing regulations that require sport fishing license holders (angler) to be able to donate their catch to nonprofit organizations or groups rather than having to go through a Sport-Caught Fish Exchange permitholder for filleting, smoking, or canning when the same fish is returned to the angler. It also considers a petitioned request under Commission petition for regulation change 2023-10.

If you have any questions or need additional information, please contact Regulations Unit Manager, Ona Alminas, at (916) 902-9222 or [Regulations@wildlife.ca.gov](mailto:Regulations@wildlife.ca.gov).

cc: Chad Dibble, Deputy Director  
Wildlife and Fisheries Division

Josh Grover, Deputy Director  
Ecosystem Conservation Division

Robert Pelzman, Assistant Chief  
Law Enforcement Division

Eric Kord, Assistant Chief  
Marine Law Enforcement Division

Craig Shuman, D. Env., Regional Manager  
Marine Region

Ryan Mathis, Acting Branch Chief  
Habitat Conservation Planning Branch

Melissa Miller-Henson, Executive Director  
Fish and Game Commission  
May 1, 2025  
Page 3

Ona Alminas, Env. Program Manager  
Regulations Unit  
[Regulations@wildlife.ca.gov](mailto:Regulations@wildlife.ca.gov)

David Thesell, Deputy Executive Director  
Fish and Game Commission

Dixie Van Allen, Program Manager  
Fish and Game Commission  
[fgc@fgc.ca.gov](mailto:fgc@fgc.ca.gov)

Proposed changes are shown in blue ~~strikeout~~/underline

| Subject of Rulemaking                                                                                                                                         | Title 14 Section(s)                   | FGC<br>Sacramento<br>June 11, 2025 | FGC<br>Sacramento<br>June 12, 2025 | MRC<br>Sacramento<br>July 16-17, 2025 | TC<br>Sacramento<br>August 12, 2025 | FGC<br>Sacramento<br>August 13, 2025 | FGC<br>Sacramento<br>August 14, 2025 | WRC<br>Sacramento<br>September 11, 2025 | FGC<br>Sacramento<br>October 8, 2025 | FGC<br>Sacramento<br>October 9, 2025 | MRC<br>Sacramento<br>November 6, 2025 | TC<br>Sacramento<br>December 9, 2025 | FGC<br>Sacramento<br>December 10, 2025 | FGC<br>Sacramento<br>December 11, 2025 | WRC<br>Ontario / San<br>Bernardino<br>January 13, 2026 | FGC<br>Sacramento<br>February 11, 2026 | FGC<br>Sacramento<br>February 12, 2026 | MRC<br>Santa Rosa or<br>Monterey<br>March 12, 2026 | TC<br>Fresno or Redding<br>April 14, 2026 | FGC<br>Fresno or Redding<br>April 15, 2026 | FGC<br>Fresno or Redding<br>April 16, 2026 | FGC<br>Teleconference<br>May 13 2026 | WRC<br>Sonoma Area<br>May 14, 2026 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------|------------------------------------|---------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|-----------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|--------------------------------------|----------------------------------------|----------------------------------------|--------------------------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------------------|-------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------|------------------------------------|
| <a href="#">Central Valley Sport Fishing (Annual)</a>                                                                                                         | 7.40(b)(4), (43), (66), (80)          |                                    |                                    | E 7/15                                |                                     |                                      |                                      | <a href="#">V/R</a>                     |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| <a href="#">Klamath River Basin Sport Fishing (Annual)</a>                                                                                                    | 7.40(b)(50)                           |                                    |                                    | X E 7/1                               |                                     |                                      |                                      | <a href="#">V/R</a>                     |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| <a href="#">Waterfowl Hunting, 2025-26 (Annual)</a>                                                                                                           | 502                                   |                                    |                                    | E 7/1                                 |                                     |                                      |                                      | <a href="#">V/R</a>                     |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Recreational Take of Barred Sand Bass                                                                                                                         | 28.30                                 | X E 6/1                            |                                    |                                       |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Commercial Red Sea Urchin <sup>2</sup>                                                                                                                        | 120.7, 120.8, 128                     |                                    |                                    | E 7/1                                 |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| White Sturgeon Sport Fishing During CESA Candidacy Emergency (First 90-Day Extension)                                                                         | 5.78, 27.93                           | EE 6/3                             |                                    |                                       |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| White Sturgeon Sport Fishing During CESA Candidacy Emergency (Second 90-Day Extension)                                                                        | 5.78, 27.93                           | E 6/3                              |                                    |                                       |                                     |                                      |                                      | EE 9/1                                  |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| White Sturgeon Sport Fishing 2084                                                                                                                             | 5.78, 5.79, 5.80, 27.90, 27.92, 27.93 |                                    | A                                  |                                       |                                     |                                      |                                      | E 9/1                                   |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Adding Golden Mussel to the List of Restricted Species Emergency                                                                                              | 671                                   |                                    |                                    | EE 6/17                               |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Adding Golden Mussel to the List of Restricted Species Emergency (First 90-Day Extension)                                                                     | 671                                   |                                    |                                    | E 6/17                                |                                     |                                      |                                      |                                         | EE 9/15                              |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Adding Golden Mussel to the List of Restricted Species Emergency (Second 90-Day Extension)                                                                    | 671                                   |                                    | A                                  |                                       |                                     |                                      |                                      |                                         | E 9/15                               |                                      |                                       |                                      |                                        |                                        | EE 12/14                                               |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Commercial Harvest of Sea Palm; Kelp and Other Aquatic Plants Harvest Reporting                                                                               | 165, 705.1                            |                                    |                                    |                                       |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        | E 1/1                                                  |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Commercial Coonstripe Shrimp Fishery Emergency                                                                                                                | 180.15                                |                                    |                                    |                                       |                                     |                                      |                                      |                                         | EE 10/7                              |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| <a href="#">Commercial Coonstripe Shrimp Fishery Emergency (First 90-Day Extension)</a>                                                                       | <a href="#">180.15</a>                |                                    |                                    |                                       |                                     |                                      | <a href="#">A</a>                    |                                         | <a href="#">E 10/7</a>               |                                      |                                       |                                      |                                        |                                        | EE 1/5                                                 |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| <a href="#">Commercial Coonstripe Shrimp Fishery Emergency (Second 90-Day Extension)</a>                                                                      | <a href="#">180.15</a>                |                                    |                                    |                                       |                                     |                                      |                                      |                                         | <a href="#">A</a>                    |                                      |                                       |                                      |                                        |                                        | <a href="#">E 1/5</a>                                  |                                        |                                        |                                                    |                                           | EE 4/5                                     |                                            |                                      |                                    |
| <a href="#">Commercial Coonstripe Shrimp Fishery</a>                                                                                                          | <a href="#">180.15</a>                |                                    |                                    | <a href="#">V/R</a>                   |                                     |                                      |                                      |                                         | <a href="#">N</a>                    |                                      |                                       |                                      |                                        | <a href="#">D/A</a>                    |                                                        |                                        |                                        |                                                    | <a href="#">E 4/1</a>                     |                                            |                                            |                                      |                                    |
| Market Squid Fishery Management Plan Amendment                                                                                                                | 53.01, 53.02, 53.03                   | D                                  |                                    |                                       |                                     |                                      | A                                    |                                         |                                      |                                      |                                       |                                      |                                        |                                        | E 1/1                                                  |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Commerical Take of Market Squid                                                                                                                               | 149, 149.1                            | D                                  |                                    |                                       |                                     |                                      | A                                    |                                         |                                      |                                      |                                       |                                      |                                        |                                        | E 1/1                                                  |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Recreational Crab Fishing Gear and Commercial Passenger Fishing Vessel Trap Validation                                                                        | 29.80, 29.85, 190, 195, 701           | D                                  |                                    |                                       |                                     |                                      | A                                    |                                         |                                      |                                      |                                       |                                      |                                        |                                        | E 1/1                                                  |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Falconry                                                                                                                                                      | 670                                   |                                    | A                                  |                                       |                                     |                                      |                                      |                                         | E 10/1                               |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Striped Bass Harvest Size Limits                                                                                                                              | 5.75, 27.85                           |                                    | N                                  |                                       |                                     | D                                    |                                      |                                         | A                                    |                                      |                                       |                                      |                                        |                                        | E 1/1                                                  |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| <del>Golden Mussel Response—Restricted Species</del> <a href="#">Golden Mussel, Green Crab, Sinanodonta and Xenostrobus - Restricted Species</a> <sup>5</sup> | 671                                   |                                    |                                    |                                       |                                     |                                      | N                                    |                                         |                                      | D/A                                  |                                       |                                      |                                        |                                        | E 1/1                                                  |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Big Game Preference Points                                                                                                                                    | 708                                   |                                    |                                    |                                       |                                     | N                                    |                                      |                                         | D                                    |                                      |                                       |                                      | A                                      |                                        |                                                        |                                        |                                        |                                                    | E 4/1                                     |                                            |                                            |                                      |                                    |
| <a href="#">Take of Morro Manzanita During Candidacy</a>                                                                                                      | <a href="#">749.14</a>                |                                    | N                                  |                                       |                                     | D                                    |                                      |                                         | <a href="#">A</a>                    |                                      |                                       |                                      |                                        |                                        | <a href="#">E 1/1</a>                                  |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| <a href="#">Recreational Red Abalone Closure Extension</a>                                                                                                    | <a href="#">29.15</a>                 |                                    |                                    |                                       |                                     |                                      | N                                    |                                         |                                      | D                                    |                                       |                                      |                                        | <a href="#">A</a>                      |                                                        |                                        |                                        |                                                    | <a href="#">E 4/1</a>                     |                                            |                                            |                                      |                                    |
| <a href="#">Extend Bull Kelp Harvest Restriction Date</a>                                                                                                     | <a href="#">165, 165.5</a>            |                                    |                                    | <a href="#">V/R</a>                   |                                     |                                      | N                                    |                                         |                                      | <a href="#">D/A</a>                  |                                       |                                      |                                        |                                        | <a href="#">E 1/1</a>                                  |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| <a href="#">Donation of Sport-Caught Fish</a>                                                                                                                 | <a href="#">231</a>                   |                                    |                                    |                                       |                                     |                                      | N                                    |                                         |                                      | <a href="#">D/A</a>                  |                                       |                                      |                                        |                                        | <a href="#">E 1/1</a>                                  |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Big Game Hunting, 2025-26 Seasons, and Chronic Wasting Disease Testing                                                                                        | 360, 362, 363, 364, 364.1, 708.5      |                                    |                                    | X E 7/1                               |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |

# California Fish and Game Commission: Perpetual Timetable for Anticipated Regulatory Actions

June 3, 2025

Proposed changes are shown in blue ~~strikeout~~/underline

## Future Rulemakings: Schedule to be Determined

| Subject of Rulemaking                                          | Title 14 Section(s)                | FGC<br>Sacramento<br>June 11, 2025 | FGC<br>Sacramento<br>June 12, 2025 | MRC<br>Sacramento<br>July 17, 2025 | TC<br>Sacramento<br>August 12, 2025 | FGC<br>Sacramento<br>August 13, 2025 | FGC<br>Sacramento<br>August 14, 2025 | WRC<br>Sacramento<br>September 11, 2025 | FGC<br>Sacramento<br>October 8, 2025 | FGC<br>Sacramento<br>October 9, 2025 | MRC<br>Sacramento<br>November 6, 2025 | TC<br>Sacramento<br>December 9, 2025 | FGC<br>Sacramento<br>December 10, 2025 | FGC<br>Sacramento<br>December 11, 2025 | WRC<br>Ontario / San<br>Bernardino<br>January 13, 2026 | FGC<br>Sacramento<br>February 11, 2026 | FGC<br>Sacramento<br>February 12, 2026 | MRC<br>Santa Rosa or<br>Monterey<br>March 12, 2026 | TC<br>Fresno or Redding<br>April 14, 2026 | FGC<br>Fresno or Redding<br>April 15, 2026 | FGC<br>Fresno or Redding<br>April 16, 2026 | FGC<br>Teleconference<br>May 13 2026 | WRC<br>Sonoma Area<br>May 14, 2026 |
|----------------------------------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|-----------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|--------------------------------------|----------------------------------------|----------------------------------------|--------------------------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------------------|-------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------|------------------------------------|
| Santa Cruz Harbor Salmon Fishing (CFGC Petition 2016-018)      | TBD                                |                                    |                                    |                                    |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Possess Game / Process Into Food                               | TBD                                |                                    |                                    |                                    |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| American Zoological Association / Zoo and Aquarium Association | 671.1                              |                                    |                                    |                                    |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Night Hunting in Gray Wolf Range (CFGC Petition 2015-010)      | 474                                |                                    |                                    |                                    |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Donation of Fish to Non-Profit Organizations <sup>1</sup>      | TBD                                |                                    |                                    |                                    |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Electronic Report Cards                                        | 1.74, 5.79, 5.80, 5.81, 5.87, 5.88 |                                    |                                    |                                    |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Shellfish Aquaculture Best Management Practices                | TBD                                |                                    |                                    |                                    |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Ridgeback Prawn Incidental Take Allowance                      | 120(e)                             |                                    |                                    |                                    |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Marine Protected Areas (MPAs) <sup>3</sup>                     | 632                                |                                    |                                    |                                    |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |
| Lands Pass - Hope Valley Wildlife Area <sup>4</sup>            | TBD                                |                                    |                                    |                                    |                                     |                                      |                                      |                                         |                                      |                                      |                                       |                                      |                                        |                                        |                                                        |                                        |                                        |                                                    |                                           |                                            |                                            |                                      |                                    |

### KEY

CFGC = California Fish and Game Commission MRC = CFGC Marine Resources Committee WRC = CFGC Wildlife Resources Committee TC = CFGC Tribal Committee OAL = Office of Administrative Law

EM = Emergency **EE = Emergency Expires** E = Anticipated Effective Date (**RED "X" = expedited OAL review**) EUF = Effective Upon Filing w/ Secretary of State

N = Notice Hearing D = Discussion Hearing A = Adoption Hearing V = Committee Vetting R = Committee Recommendation 1 = Considers CFGC Petition 2023-10 2 = Considers CFGC Petition 2023-04

3 = Considers MPA Petitions/sub-actions: 2023-22MPA (sub-actions 1, 2, 4, 6); 2023-25MPA (sub-actions 1, 3); 2023-26MPA (sub-actions 2, 3, 4); and 2023-31MPA (sub-actions 1, 2) 4 = Considers CFGC Petition 2018-016(a) 5 = Considers CFGC Petition 2017-006

**California Fish and Game Commission**  
**Potential Agenda Items for the August 2025 Commission Meeting**  
*May 30, 2025*

The next Commission meeting is scheduled for August 13-14, 2025 in Sacramento, with Zoom and phone options for the public. This document identifies potential agenda items for the meeting, including items to be received from staff and the California Department of Fish and Wildlife (Department).

**Wednesday, August 13: Wildlife- and Inland Fisheries-Related and Administrative Items**

1. General public comment for items not on the agenda
2. Commission executive director report and Department reports (director and Law Enforcement Division)
3. Notice hearing: Add golden mussel, green crab, and *Sinanodonta* and *Xenostrobut* to the restricted species list regulations
4. Discussion hearing: Striped bass harvest size limit regulations
5. Discussion hearing: Morro manzanita Section 2084 take provision regulations (*if approved by the Commission to add*)
6. Adoption hearing: White sturgeon sport fishing 2084 regular rulemaking regulations (*if approved by the Commission to add*)
7. Determine whether listing quino checkerspot butterfly (*Euphydryas editha quino*) as endangered under the California Endangered Species Act is warranted
8. Receive a presentation from the Department on the five-year status review for Bogg's Lake hedge-hyssop (*Gratiola heterosepala*)
9. Wildlife and inland fisheries petitions for regulation change<sup>1</sup>
10. Wildlife and inland fisheries non-regulatory requests from previous meetings<sup>1</sup>
11. Commission committee reports (Wildlife Resources Committee, Tribal Committee) and Department reports (Wildlife and Fisheries Division, and Ecosystem Conservation Division)
12. Executive (closed) session

**Thursday, August 14: Marine-related and Administrative items**

13. Commission justice, equity, diversity and inclusion plan update
14. Commercial coonstripe shrimp fishery emergency regulation – first 90-day extension (*if approved by the Commission to add*)

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<sup>1</sup> Staff is authorized to remove this agenda item if there are no actionable, referred, or new items, in which case any new regulation change petitions or non-regulatory requests delivered at the meeting will be received under the general public comment agenda items on Wednesday or Thursday.



15. Notice hearing: Commercial bull kelp harvest restriction date regulation (*if approved by the Commission to add*)
16. Notice hearing: Donation of sport-caught fish regulations (*if approved by the Commission to add*)
17. Notice hearing: Recreational red abalone closure extension regulations
18. Adoption hearing: Market squid fishery management plan amendment
19. Adoption hearing: Commercial take of market squid regulations
20. Adoption hearing: Recreational crab fishing gear and commercial passenger fishing vessel trap validation regulations
21. Experimental fishing permit (EFP) major amendment: Deep-set buoy gear and night-set buoy gear
22. Marine petitions for regulation change<sup>1</sup>
23. Marine non-regulatory requests from previous meetings<sup>1</sup>
24. Commission committee report (Marine Resources Committee) and Department report (Marine Region)
25. Administrative items (legislative report, rulemaking timetable updates, future meetings, and new business)
26. General public comment for items not on the agenda

#### **Expected Reports or Other Significant Documents to be Received**

1. Department's evaluation of the petition to list Gerry's curly-leaved monardella (*Monardella sinuate* subsp. *gerryi*) as endangered under the California Endangered Species Act (consideration of whether the petitioned action may be warranted will be scheduled for October 2025)